THE IRON AGE

New York, Thursday, January 13, 1910.

New 16-In. Cincinnati Lathes.

The latest 16-in. lathe built by the Cincinnati Lathe & Tool Company, 2730 Spring Grove avenue, Cincinnati, Ohio, is equipped with either of two all geared feed devices, one having an unlimited range and adapted for general manufacturing and the other for screw cutting. Fig. 1 shows the lathe with a three-step cone pulley and quick change gear device, while Fig. 2 illustrates the same model with double back gears and the all geared feed device.

All of the gears in the quick change gear box are made from bar stock and those operating loose on shafts are bushed with bronze. The gear box provides 40 different changes without duplicating or removing a gear by simply shifting the conveniently arranged levers. All of these changes can be made while the lathe is taking its heaviest cuts. Either five-step or wide three-step cone pulleys with double back gears

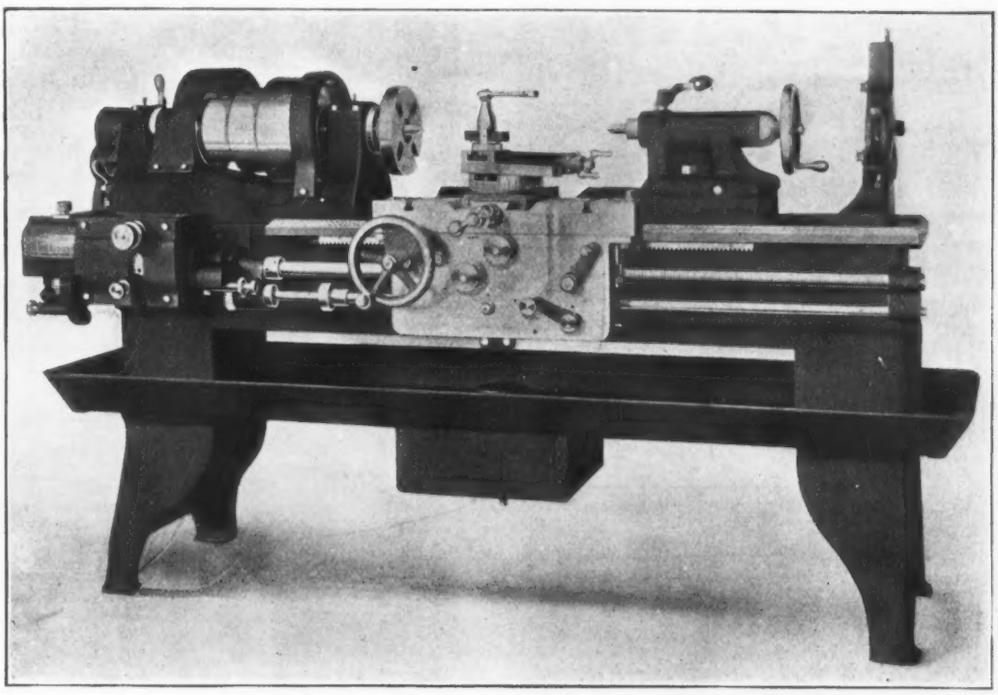


Fig. 1.—A 16-In. Lathe with Three-Step Cone Pulley, Oil Pan and Quick Change Gear Device, Built by the Cincinnati Lathe & Tool Company, Cincinnati, Ohio.

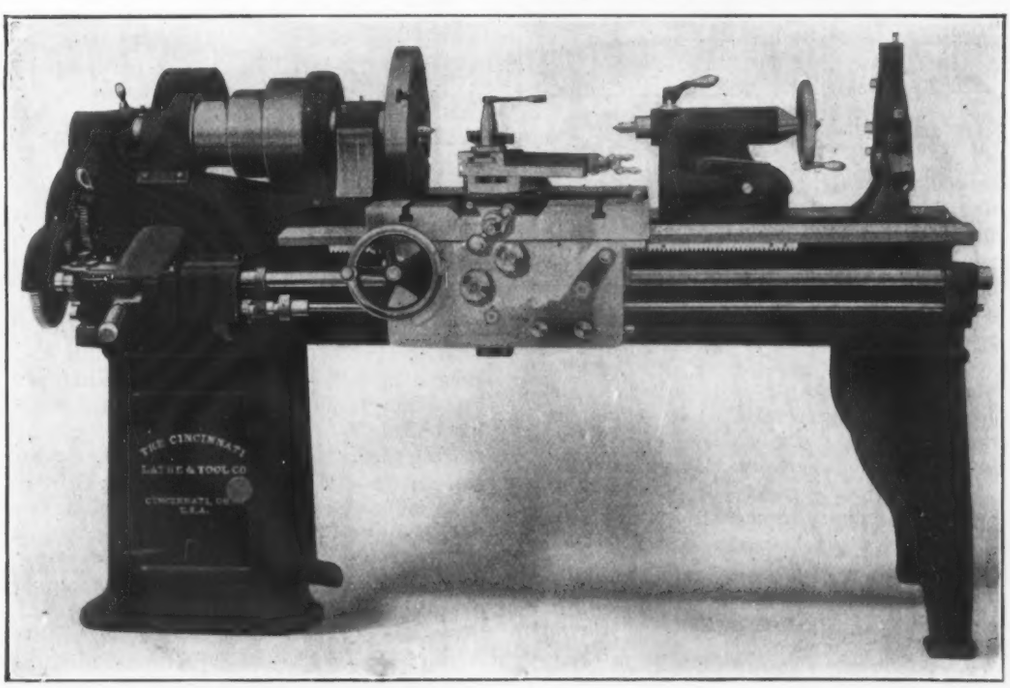


Fig. 2.—A 16-In. Cincinnati Lathe with Wide Three-Step Cone Pulley, Double Back Gears and All Geared Feed Device.

are furnished, and with a two-speed countershaft provide 20 and 18 changes of spindle speed, respectively, covering a wide and carefully selected range. The spindle is hollow, made of 0.65 per cent. carbon crucible steel, and runs in large phosphor bronze bearings. The front one is 2¾ x 5¼ in. and the other is $2\frac{7}{16}$ x 4¼ in.

These lathes are now supplied with a double wall box type apron, shown in Fig. 3, which gives rigid

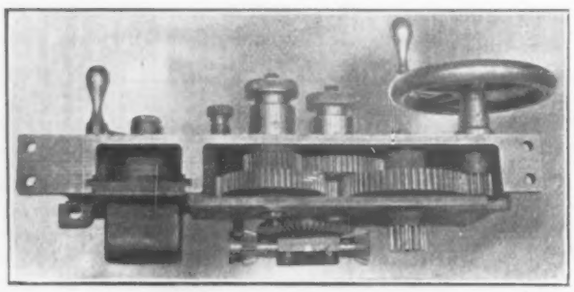


Fig. 3.—Detail of the Double Wall Box Type Apron.

support and long life to all the studs and shafts, and contains gears of 10 pitch. The longitudinal and cross friction feeds can be started, stopped or reversed while the lathe is running, but cannot be engaged when cutting screws. A system of compound gearing transmits the motion to the rack pinion, and the hand wheel

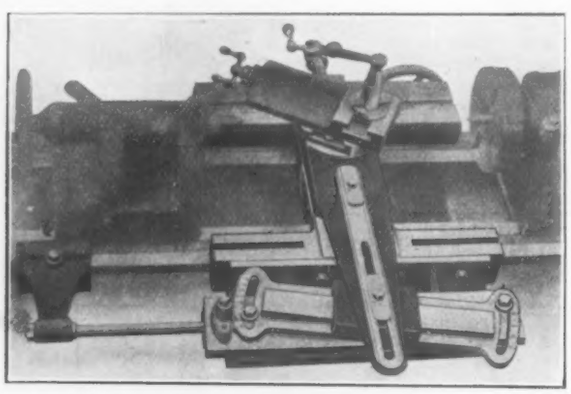


Fig. 4.—Detail of the Taper Attachment.

turns exceptionally easily. A chasing dial is provided for catching the threads at any point and an automatic stop to throw out the feeds.

All plain bearings are scraped to surface plates and the centers fitted to gauges. The shafts are of machinery steel turned and ground cylindrically true, while the bed and the head and tail stocks are planed to templets and bored in jigs. These lathes have reduced ⅞-in. shafts of 0.50 per cent. carbon steel with 1-32 in. feed at a cutting speed of 60 ft. per minute.

The taper attachment illustrated in Fig. 4 is fastened to the carriage and not to the bed, and may be applied to a lathe originally purchased without it. The graduations at one end are in degrees and at the other in inches; either 10 degrees or 4-in. tapers can be cut on pieces not exceeding 12 in. long.

The principal dimensions are as follows:

Swing over bed, in.	17½
Swing over carriage, in.	11¼
Diameter front journal, in.	2⅞
Length of front box, in.	5¼
Diameter back journal, in.	2 7-16
Length of back box, in.	4¼
Width of belt, 5-step cone, in.	2½
Width of belt, 3-step cone, in.	3¼
Ratio of back gears, 5-step cone	10 to 1
Ratio of back gears, 3-step cone	3 1-3 and 9½ to 1
Morse taper, No.	3
Diameter of countershaft pulleys, in.	3½
Speed of countershaft, rev. per min.	125
Hole in spindle, in.	1¼
Distance between centers, 8-ft. bed, in.	58
Diameter nose of spindle, in.	2 7-16
Diameter of tailstock spindle, in.	2

The Roe Blast Furnace Stock Distributer.

BY B. G. KLUGH.

In blast furnace operations no factor is concededly of greater importance than the distribution of the stock in charging. However desirable the stock in physical and chemical characteristics, or however perfect be the design and equipment, the operations will be hopelessly handicapped if the stock is place in the furnace with improper relation of the lump to the fine stock. In all skip filled furnaces, where the stock is placed in the hopper, it enters by sliding off an inclined plane. Thus the lumps will attain a higher velocity than the fine ore and so be arranged in a vertical section on one side of the hopper, besides being projected continuously so inside the furnace.

In hand filled furnaces the problem is thought to be largely solved by continuously placing each charge

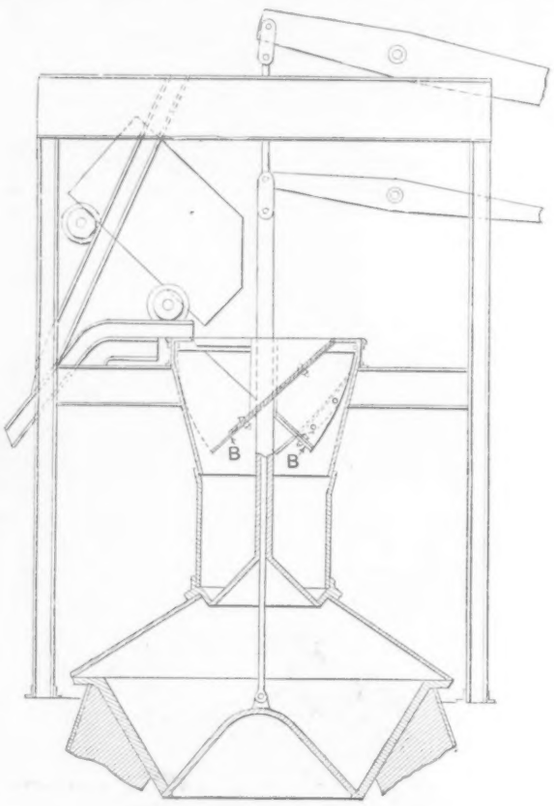


Fig. 1.—Section of Blast Furnace Top with Roe Stock Distributer.

one point farther around the periphery of the hopper than the preceding charge, thus getting the stock arranged in parallel spirals of each kind, provided the top fillers carry out orders. Several large furnaces have clung to the more expensive method of filling, fearing the bad distribution usually incident to mechanical charging.

A number of very ingenious appliances have been designed to correct this very obvious fault in mechanical charging. All of these depend upon a certain amount of mechanical appliances on top of the furnace, as well as a certain degree of personal attention. There are thus two important factors, neither of which is assured reliable. All experienced furnacemen agree that the fewer working parts on top of the furnace the better, and that the elimination of the personal equation is a very desirable proposition.

In consideration of the above mentioned conditions the distributing device herewith described was designed. The illustrations, Figs. 1 to 4, show its absolute simplicity. To make the explanation of its operation plainer, suppose the skip discharge lines to lie north and

south. Now, as the north skip discharges, the entire skip load is cut in two equal parts in a vertical plane by the apex line of the chutes, A. The portion to the north is deflected to the side of the hopper and enters it as though no distributer were present. The portion of this skip load to the south is deflected by the inclined plane of the chute bottom B and enters the hopper, cutting the north portion at right angles.

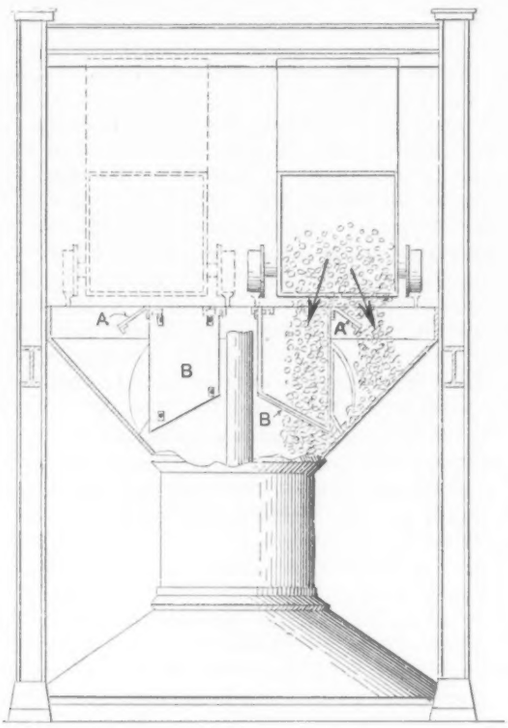


Fig. 2.—View of Distributer at Right Angles to Fig. 1.

The south skip in discharging its load is cut in the same way as the north skip, except that the directions are reversed as compared with the direction of the streams from the north skip. In this way every two consecutive skip loads charged enter the hopper and are distributed on four points. This is done every time

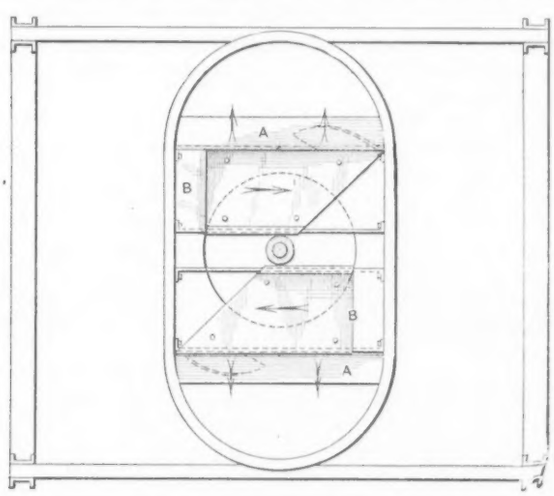


Fig 3.—Sectional Top Plan View.

in exactly the same way, without any dependence upon either man or machinery.

Furthermore, since the coke is discharged directly on the chutes, the usual fall to the hopper which prevalently breaks up the coke is avoided. Practically all other devices have added to rather than diminished this undesirable feature of breaking up coke. There being no working parts, there is nothing to clog up or interfere in any way with the operations and no attention is necessary, as when constructed of heavy plate the appliance will outlast an ordinary furnace lining.

This distributer was put in use on furnace B of the Toledo Furnace Company, Toledo, Ohio, after about four months of its second blast. Thus there was an excellent opportunity to show the comparative workings of the furnace with and without the distributer. Prior to its installation the stock was tested by hand at four points several times daily. The average variation of the top of the stock was 5 ft., the maximum being 9 ft. and the minimum 1 ft. After the installation of the distributer the hand testing was continued and the variations of the four points were found never to exceed 2 ft., with an average variation of 1 ft. This campaign was being made on a patched lining, and after about eight months operation the furnace developed a "hot spot." But before two days had elapsed this "hot spot" extended in a ring of uniform hight entirely around the furnace. No better testimony to the uniformity of the stock distribution could be offered. The furnace was run both before and after the installation on basic, malleable and foundry iron in turn, using different classes of stock in every case. Forty-eight hours after this top was put on the tuyeres showed a more uniform heat than had ever been noted previously on this furnace.

In discussing this distributer with the manager, while he would give out no figures for publication, the general statement was made that the saving in fuel,

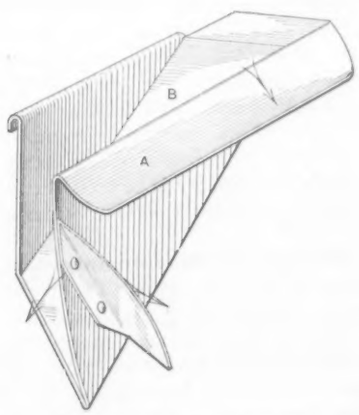


Fig. 4.—One Section of the Distributing Device.

the uniformity of product and the increase in production more than paid for the entire cost of installation in one month. The device is protected by United States patent No. 926,357. The inventor, J. M. Roe, also has patented a modification of the distributer adapted to furnaces using a single skip car.

The United States Sherardizing Company, New Castle, Pa., has granted Sherardizing licenses to the Muerer Bros. Company, Brooklyn, N. Y.; Bromwell Brush & Wire Goods Company, Cincinnati, Ohio; Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.; Union Switch & Signal Company, Swissvale, Pa.; Canadian General Electric Company, Toronto, Can., and National Wire Goods Company, Niles, Mich. The National Metal Molding Company, Pittsburgh, Pa., is turning out about 30 tons a day of Sherardized conduit pipe and is now erecting a plant to double its capacity, being unable to keep up with its orders.

The Ernst Wiener Company, whose general offices are at 50 Church street, New York City, has opened new offices in the following cities: No. 38 Sycamore street, Petersburg, Va.; Ocala, Fla.; Toronto, Ont., Can.; Apartado 123 bis., Mexico City, Mex. New addresses of other branch offices are as follows: Los Angeles, 223 W. H. Hellman Building; Philadelphia, 1103 Land Title Building; San Francisco, 112 Market street.

American and European Machine Shop Methods.—I.

The Shops and the Industrial Schools.

BY WILLIAM H. DOOLEY.*

As an American goes about among the machine and engineering factories of Europe he is greatly surprised at the difference in the organization of the metal industries in Europe and the United States. The European factories do not utilize machinery and all sorts of devices to save manual labor, which is carried out so extensively in the United States. Then, again, there is lack of the division of labor in the factories. In all the European factories they attempt to make all kinds of tools, while in the United States the industry is so highly specialized and each factory makes only a few lines of tools, and in a great many cases only one type of machine. As a result of this difference in organization the majority of American manufacturers can undersell in European territory the native tool manufacturers, and this despite the lower wages paid in Europe.

The American machine tool houses, which, for example, are engaged in making boring mills may be expected not only to turn out a highly specialized tool, but to offer various sizes of this tool in a highly perfected form. Such American establishments can hope to undersell, every day in the year, a European firm which occasionally makes, and then to order, a tool of the same type. This fact is recognized all over Europe. The same statement applies to lathes. In other words, we owe our ability to excell the foreigner to superior shop organization and to superior technical knowledge.

Our Superior Shop Organization.

The question may be asked, Can't the European manufacturer copy our shop organization? The present shop organization in our country is distinctly American and is due to the tendency among the artisan class of this country to abandon the slow hand processes. This tendency has been as strong as the tendency in Europe has been to disregard machine processes. Moreover, there has been developed among the (metal workers) laboring classes in the United States a mobility such as is unknown elsewhere in the world. In this way ideas and methods have been carried from one shop to another.

Another advantage which has contributed to the rapid development of our methods of manufacture in the United States is the comparative freedom from inherited and over-conservative ideas. This country has entered upon its industrial development (particularly the metal trades) unfettered by the old order of things, and with a tendency on the part of the people to seek the best and quickest way to accomplish and manufacture every piece of machinery.

In all the European countries or communities where there are metal works and where it is the principal industry the transition from the household or small establishment to the plant or factory system was hampered by guilds, elaborate national and local restrictions and by the national reluctance with which a people accustomed to generations of fixed methods of work, in which they have acquired a large degree of skill, abandon those methods for new ones. It was natural, also, that in spite of the superior advantages of machine methods, hand processes of manufacture should still continue side by side with them in the machine shops.

On the other hand, the European manufacturer has the advantage of having the disposition and government on his side. This is a very important point at this period of the world's history, because competition, which naturally exists in a form at least equally acute between the manufacturers of different countries, is liable to be seriously handicapped in the industrial race by want of complete knowledge of the circumstances which either hinder or assist their rivals. Hence a very prominent place must be given to the aptitudes, dispositions and habitual practices of workmen. The European manufacturer is not troubled by ignorant labor leaders insisting on terms which could not be granted without serious injury to the business in which they are engaged. The apprenticeship system is in vogue because the manufacturers have more faith in their workers than we have.

Germany Our Nearest Rival.

Of all the European countries Germany is the nearest rival to this country. The average American does not realize the gain made by this country. The German manufacturers are putting more engineering thought into their designs than at any other time in the history of tool construction. The mechanical skill still holds in favor of the Americans, and will probably remain to their credit in the case of those American firms which are paying close attention to the drawing rooms. Every tool that is imported into Germany is subject to scrutiny, and if engineering skill backed up by careful mathematical deductions can make an improvement, the German will be the first to discover the fact. Within a short time a new machine will be on the market with some improvements.

The great industrial section of Germany lies along the Rhine, and particularly the iron steel works are carried on principally in Düsseldorf, Essen, Duisburg, Oberhausen and Ruhrort. The modern industrial evolution of the Rhine District in iron and steel manufactures, which have attained such a remarkable development, is probably due in the first instance to the coal mines of the province and of Westphalia, which adjoins it on the eastern side, and in the second to the great waterway of the Rhine and an excellent system of railroads.

In Düsseldorf the iron and steel factories are on the outskirts of the city. The factories (iron and steel) are equipped with foundries and employ a great many men. Messrs. Haniel & Lueg employ 2000 men and make all kinds of engines and machinery. Heavy machine tools, hydraulic presses and steel ingots are sent to Glasgow and Sheffield; also crankshafts for electrical machinery in large quantities are sent to Manchester. The workingmen live in flats and not cottages.

Essen does not represent the most common type of industrial community; it is simply a one-man town. In 1811, when the first crucible furnace for casting steel was set up by a poor, hard working young man, Friedrich Krupp, the total population of Essen was under 4000. In 1901 it was 183,500, out of which the Krupp contingent numbered about 84,000. Now this and a great deal more is essentially the work of one man, and it is unparalleled in the history of industry. The corporation now owns iron and coal mines, and has put up over 4000 houses.

Number of Employees in Krupp Works.

Steel works at Essen and proving grounds	33,917
Gruson works at Buckau	3,848
Shipbuilding yard at Kiel	3,746
Coal mines	9,896
Blast furnaces, iron ore mines, &c.	11,784
Total	63,191

* Principal Lawrence Industrial School, Lawrence, Mass.

Apart from Krupp's the industries are not extensive. The products from Krupp's are very varied. Their fame is chiefly associated with war materials, but all kinds of finished and unfinished materials for railroads, engines, tools, mills and other industrial appliances are turned out in large and small quantities.

The shops have been built at very different dates and vary accordingly; but as a whole they possess in a marked degree that order and cleanliness which is the most distinguishing feature of German factories. This extends to the foundries, where one usually finds dirt, smoke and confusion.

A specialty here is the casting of very large ingots of crucible steel; it is a remarkable sight and an object lesson in German methods. Ingots of 85 tons are cast—a feat which is not attempted elsewhere. The steel is melted in small crucibles which are carried by hand, and therefore contain no more than two men can lift. Scores of such crucibles go to the making of an ingot of considerable size, and they occupy many furnaces, which are ranged on both sides of the foundry, with the ingot mold in the middle. At the signal the furnaces are opened and the crucibles are drawn out and seized by a small army of workmen, who run them down to the mold and pour them in. It is clear that to do the thing on a large scale perfect method in preparation and order in execution are necessary. The maneuver is carried out with military precision and promptness. In a moment the place is aglow with the white heat of the furnace, the figures run from all sides and come staggering down in pairs with the pots full of liquid steel. It is a scene of intense activity, but without confusion. One after another the glowing pots are emptied; the molten metal runs like thick soup and plumps into the mold with a bright sputter. In a few minutes it is all over; the furnaces close again, the used crucibles are thrown aside, and already the cast mass begins to congeal and change color, while presently it dulls to yellow, and the tint deepens as you watch. The steel so made is the purest known, close grained, homogeneous and uniform throughout. This is not done in this country (United States), where the impatience of hand processes, which is characteristic and has led to such remarkable developments of automatic machinery, has its weak side. The most recently built workshops at Krupp's are quite up to date in their construction—light, spacious and airy, but they are in no way superior to the ones in Sheffield, England.

German Factories Clean and Orderly.

The most striking feature of German iron and steel factories is their clean, orderly and well kept condition. These qualities seem to be universal, and they extend to the dirtiest and most untidy departments. The German foundries were a revelation to me. They are as clean and well kept and almost as light as any other shop. The remarkable order maintained is systematic, and in a large measure intended to promote the prevention of accidents. In the accident prevention rules of the Rhine-Westphalian Engineering and Small Iron Industries Association I find in the first paragraph that

"The gangway in all workshops must be broad enough to exclude as far as possible injury to persons using them by machinery or transmission parts in motion. They must be kept in good condition and must not be blocked by the heaping of material or the transportation of articles."

Compare this with most of our (United States) engineering shops. There is no room. The different parts of the American shops are congested and manufactured or half manufactured articles are lying promiscuously about in all directions, blocking the fanway. The entire freedom from such disorderliness in German shops and workrooms undoubtedly conduces to efficiency as well as to safety, and it is secured chiefly through the habits of order inculcated into all alike—workmen, managers and owners—by the military discipline they have alike undergone. Fencing of machinery, however, is less complete and costly than that which is required in most factory districts in England and America.

With regard to the installation of machinery and workshop appliances, the German establishments are, generally speaking, quite up to the mark. They make use of electric power, automatic tools and similar modern devices to as great an extent as any in England or America. There is no hesitation in introducing innovations and no opposition on the part of the work people. Machinery and tools are procured from any part of the Continent or any country without regard to any consideration but suitability; but Germany is year by year becoming more self-sufficing in this respect. Their small tools are as good as the American, their heavy ones as the English.

Outside the rooms, German workshops are well provided with sanitary washing and dressing accommodations. The workmen are more cleanly and careful in their habits than the English; they generally keep a working suit of clothes and change before and after work. Consequently, lockers are provided. Baths are common, particularly shower baths with hot and cold water, and in summer they are much used. The practice of providing comforts and conveniences for them (the employees) is commoner in Germany than in this country or England.

The work people in the German iron and steel factories are good, steady, regular and trustworthy, but not as quick as the Americans, but they do what they are told and do it well. German mechanics are often seen working on an engineering order from England and they use the original drawing with the English measures. Could the American mechanic do the same? The German mechanics are not in the least inventive; they never make suggestions, nor is there any system of encouraging them to do so, but they keep the rules and do not shirk. This is one of the principal reasons why the German industry is so strong.

Working Hours in Germany.

Roughly speaking, the working hours in the metal works are 10 a day. The following time schedules, taken from various representative machinery works, will show exactly the length and distribution of the day's work.

Hours in Engineering Works at Düsseldorf.

Begin	6.30 a.m.
Breakfast	8.15 to 8.30 a.m.
Dinner	12 to 1.30 p.m.
Tea	4.15 to 4.30 p.m.
Close	6.30 p.m.

Total 12 hours, minus 2 hours for meals, = 10 hours. Week, 60 hours.

Hours in Machinery Works at Düsseldorf.

Begin	7 a.m.
Dinner	12 to 1.30 p.m.
Close	6.30 p.m.

Total, 11½ hours, minus 1½ hours for meals = 10 hours. Week, 60 hours.

Hours in Cutlery Works at Solingen.

Begin	7 a.m.
Breakfast	9 to 9.15 a.m. (youthful workers), 9 to 9.30 a.m.
Dinner	12 to 1.30 p.m.
Tea	4 to 4.15 p.m. (youthful workers), 4 to 4.30 p.m.
Close	7 p.m.

Total, 12 hours minus 2 hours for meals = 10 hours. Week, 60 hours for men, 58½ hours for women (law forbids the employment of women after 5.30 p.m. on Saturdays and on the eve of holidays)

Hours in Engineering Works at Chemnitz.

Begin	6 a.m. (winter, 7 a.m.)
Breakfast	8 to 8.30 a.m.
Dinner	12 to 1 p.m.
Tea	4 to 4.15 p.m.
Close	6 p.m. (winter, 7 p.m.)

Total, 12 hours minus 1¾ hours for meals = 10¼ hours. Week, 61½ hours.

Hours in Steel Works at Essen (Krupp).

Begin	6 a.m.
Breakfast	8 to 8.15 a.m.
Dinner	12 to 1.30 p.m.
Tea	4 to 4.15 p.m.
Close	6 p.m.

Total, 12 hours minus 2 hours for meals = 10 hours. Week, 60 hours.

The great difference between England and Germany is that Germany averages about one day more than England. This difference is due to the half holiday on Saturdays and difference in meal hours in England. The deliberateness and respect for meals is as characteristic of Germany as indifference to them and hurry are of the United States.

Wages are but little less in the manufacturing (Rhineland) section of Germany than in Germany. In engineering workshops in Prussia, fitters—called engineers in England—earning 36 shillings ($8.76 a week; men doing the same work in England were getting 38 shillings ($9.25) a week, the standing wage of the Amalgamated Society of Engineers, but the week is 60 hours in Prussia against 54 in England.

Industrial Education Essential for Our Continued Supremacy.

The writer has already pointed out that the American manufacturer of machine tools excells the European manufacturer in shop efficiency and superior technical knowledge. But the European shop manufacturers are learning wonderfully well how to get the maximum capacity—of work out of tools. Of course, it takes time, and one can often see two men on a gear cutter, where the American designer of tools never contemplated that more than one man should be employed. On the whole they do not yet understand, in the great majority of the German shops, how to operate the greatest number of tools with the least number of men. This calls for the highest degree of intelligence and skill, such as is found to-day in the most enhanced form in our best American shops. But this is something that can be copied and learned in a very short time, and if we Americans propose to keep ahead in shop efficiency and in our ability to run a shop with the least possible number of men, we must look to the training of our workmen from boyhood up. This can be best done not by the crude methods of the machine shop, but by this experience supplemented by industrial education.

There is a well founded belief on the Continent of Europe that the loss of English trade in machine tools has been due to this very lack of industrial education. The Germans, on the other hand, by an elaborate system of education, have been able to educate their workers to such a degree of efficiency that they no longer purchase machine tools from England.

How Industrial Education Sprung Up in Europe.

In the early days of the last century, and in some places to-day, the machine shop trade of Europe was conducted on a small scale by a master with a number of workers and a few apprentices. The master took the boys and taught them during a certain number of years the machine trade. He was legally bound to do this. This was, as history proves, a good method only so long as the master had time to teach the apprentice and the apprentice had time enough to spare to learn all about his trade. But when the modern era of prosperity was being ushered in by the great political, social and industrial revolutions, the master was so busy maintaining himself against the competition of others and keeping up with the technical advancement of his trade that time failed him for the instruction of his apprentice. On the other hand, the apprentice found that the trade had developed to such an extent and such complexity that he could no longer learn its fundamentals by mere activity in his master's workshops.

There was no time to teach nor to learn. Teaching and learning had to be done in some other place and at some other time. Where could it better be done than in a meeting of all the apprentices with teachers to instruct—in other words—in a school. When could meetings or schools best be held but outside of working hours, namely, in the evenings and on Sundays.

Thus we see the first stages of industrial or technical education in the metal trades—sessions to meet the needs of apprentices—on Sunday mornings and work day evenings. These schools are called continuation schools, because originally they were the evening schools for elementary school graduates. The best industrial schools in Europe are in Germany, and in order to give an idea what these schools are doing the writer will describe one of the best continuation schools for machinists' apprentices at Munich.

(To Be Continued.)

The Philadelphia Foundrymen's Association.

The regular monthly meeting of the Philadelphia Foundrymen's Association was held on the evening of January 6 at the Manufacturers' Club, with President Thomas Devlin in the chair. After transacting routine business and receiving reports of standing committees, the following were elected to membership in the association: Matlack & Bates, pig iron and coke merchants, Pennsylvania Building, Philadelphia, represented by H. C. Matlack; Marwick, Mitchell & Co., Drexel Building, Philadelphia, represented by A. W. Norman.

The subject of corporate taxation by the Federal Government, as provided for in the recent tariff act, was again brought up for discussion. It was decided that a special meeting of the association should be held on the evening of January 17 for more thorough consideration of this important matter, and that corporate interests in the foundry and allied trades be invited to be present and participate in the discussion, on which further action by the association would be based.

There being no further nominations, in addition to those recommended by the nominating committee, the following officers were unanimously elected for the ensuing year: President, Thomas Devlin; vice-president, Elmer E. Brown; treasurer, Josiah Thompson; secretary, Howard Evans; executive committee, Walter Wood, chairman, H. L. Haldeman, Thomas M. Eynon, S. S. Knight and Walter T. MacDonald; trustees, Thomas Devlin, Josiah Thompson and Howard Evans; official chemist, George C. Davis.

The paper presented for the evening discussion was on "Electric Furnaces and Electric Furnace Products," by Henry M. Lane, editor of *Castings,* Cleveland, Ohio. The paper was illustrated with a large number of lantern slides, while samples of abrasive products, refractory materials and metals and metal alloys made in the electric furnace were shown. The various types of electric furnaces in use in this country and abroad were described, as well as their products, such as carborundum, alundum, aloxite and other abrasives, artificial graphite, pig iron, steel, aluminum and ferroalloys. Duplex processes, in which the final treatment of metals is made in the electric furnace, were particularly referred to. The most important use of the electric furnace for steel work has thus far been in competition with crucible steel. It might be adapted for the final treatment of molten iron to be used for gray iron castings, for purposes demanding stringent specifications. Mr. Lane was given a unanimous vote of thanks for his interesting paper, after which luncheon was served.

The Western Society of Engineers, 1735 Monadnock Block, Chicago, has elected the following officers for 1910: President, J. W. Alvord; first vice-president, O. P. Chamberlain; second vice-president, A. Bement; third vice-president, W. K. Hatt; treasurer, A. Reichmann; trustees, L. E. Ritter, G. M. Brill, W. W. Curtiss.

Agricultural Machinery in France.

PARIS, December 23, 1909.—During the recent debate in the French Chamber of Deputies on the new customs tariff M. Plissonnier made a most interesting speech on the subject of agricultural machinery, of which the following is a slightly abridged report:

"I am a purchaser and at the same time a builder of agricultural machines. I was one of the first to make these machines in France. My brother is also a manufacturer. I have been in business 40 years. I construct about a third of the machines I sell, I purchase another third from my French colleagues who are makers of special machines and the rest I buy abroad—a few in Germany, more in England, and finally in America, the home of the world's great industry.

"At the present moment Italy, to encourage the use of agricultural machinery and thus eke out the scanty supply of labor, allows premiums to the buyers of machines. Tunis, a country under our protectorate, has abolished the customs duty on machines. Eastern countries also facilitate their importation. In France the difficulty of finding labor tends to increase the use of machines.

"The American manufacturers who rule the market, not only in France but throughout the world, have—and this is their strength—a capital of a milliard francs ($200,000,000). They employ over 100,000 workmen and annually produce finished goods to the value of $112,000,000. These figures were obtained by M. Pecard Mabille when he went to the Chicago Exposition. The annual output is 470,000 sowers, 128,000 manure spreaders, 655,000 instruments for bean and beet root cultivation, 790,000 harrows, 1,311,000 plows, 115,000 harvesters and binders, 60,000 simple harvesters, 62,000 hay cutters, 236,000 horse rakes, 367,000 mowers, 19,500 grain sorters, 76,263 corn shellers and 11,369 horse or steam threshers. The French makers, M. Pecard Mabille wrote, must specialize and combine to establish prices, so as to sell as cheaply as possible with a fair profit. This is what is done by American manufacturers; they have all (at least the large firms) the same terms, to which they adhere strictly, thus avoiding cutting prices.

"In 1907 France imported 34,839 tons of agricultural machinery, valued at about $4,800,000. Of this 22,205 tons came from the United States, 3989 tons from Great Britain, 2391 tons from Canada, 3655 tons from Germany, 1299 tons from Belgium and the remainder from other countries.

"I must do justice to the efforts of French manufacturers. I have bought from firms which specialize and sell as cheaply as or even more cheaply than the Americans. All the firms who have taken up special lines show good results. Thus, in 1907, French makers exported machines to a value of $1,270,500. The 1908 exports were valued at $1,382,000. At the present moment these firms which have the necessary capital and plant have specialized certain machines and have closed the French market to the foreigner. Thus, foreign horse rakes, haymakers and extirpators are no longer imported; several works in the north and east, at Nevers, at Montataire, furnish all the machines of these kinds required by French agriculture. One maker at Bourbon-Laney has supplied over 12,000 this year. All these manufacturers sell cheaper than the Americans. There are two large makers of grain sorters, at Niort and at Paris, who are masters of the market. I am not aware that any of these articles are imported. Threshing engines and machines are made at Vierzon, Nevers, Orleans, Chateauroux and Liancourt. Hardly any foreign made threshing machines are now employed in France, only some 15 or 20 English machines entering our ports each year.

"As to vineyard apparatus, pumps, presses, filters, &c., no foreign manufactures are used. Factories exist at Lyons, in the Ille and Vilaine, at Amboise, Paris, Beaune, Villefranche, Carcassonne and Bordeaux and are everywhere prosperous. The milk question has assumed great importance of recent years. Until quite lately cream separators were all of foreign make. A Cambrai firm took up their manufacture and can now successfully withstand foreign competition. As to root cutters, these are made in eastern France where cast iron is creapest. They are no longer imported. The same is the case with the special plows known as Brabants. M. Bajac of Liancourt has specialized these, and neither American, British nor German firms have sought to imitate him.

"I have mentioned the persevering efforts of these French manufacturers, who all commenced business in a very modest manner and now rule the French market. I will now compare a few French and foreign prices. The 75-liter cream separator from Sweden sells at $35; the English Alexandra, 90 liters, at $40; the Cambrai firm I mentioned sells a 75-liter separator at $30.80. The McCormick mower is sold at $60 to $64; the Wood at the latter price. French mowers cost about the same. The importers of these American machines sell them wholesale to their French agents at $54. The French constructors sell similar machines at $47 to $48. Some 7000 French mowers are made yearly and nearly 40,000 American machines are imported during the same period. An American mower imported into France pays $2.40 for case and packing, $3.60 freight, $10 duty, 80 cents insurance and various formalities, making $16.80 in all. In 1888 1000 reapers were sold; now 40,000. Then, to sell a couple of dozen I had to make application after application to large landowners; now all farmers alike use them. The peasant who has but one horse no longer reaps with a scythe; he buys a machine. An 8-hp. British threshing machine costs from $980 to $1020; a Vierzon (French) machine costs $600, $700 and $800. The Ransome machine pays $82.44 duty, $55 freight from England to Orleans, and various small extras, total $157, or about 25 per cent. on its sale price."

Positive Expansion Bolt Tests.

A. C. Seaman, 1638 Hutchinson street, Philadelphia, Pa., has had tests made of the ½-in. and ⅝-in. diameter positive expansion bolts which he manufactures, by the Riehle Brothers Testing Machine Company, which show the following tensile strength as compared with other makes of such bolts:

	Seaman. Pounds.	Other makes. Pounds.
½ in. diameter	6,020	3,210
⅝ in. diameter	12,500	9,820

The test of the Seaman bolts was made in granite. The ⅝-in. bolt stood a test for tensile strength at a load of 12,500 lb., when the bolt broke at the thread. This is taken as proving that the Seaman type expansion withstands a greater tensile strain than the bolt itself.

The Colson Hardware Company and the Georgia Hardware Company, Brunswick, Ga., have been consolidated under the name of the Butts-Dubberly Hardware Company. On February 1 the new company will move into enlarged quarters, a three-story brick building at the corner of Gloucester and Grand streets, which will be fitted with modern fixtures and conveniences. The company will carry a large stock of hardware and machinery supplies, and in addition to doing a regular retail business will conduct a wholesale department. It will be incorporated with a capital of $75,000, all of which is to be paid in by March 10. The combined stocks of merchandise invoice approximately $60,000, and the new company takes these over clear of all liabilities.

MECHANICALLY HELD IMPURITIES IN STEEL.

A Method of Eliminating Oxide, Slag and Gases and Preventing Segregation and Piping—The Place of the Electric Furnace.

BY GEORGE AUCHY, PHILADELPHIA.

By mechanically held impurities the writer means oxide, slag (whether ordinary or manganese silicate and sulphide) and gases thrown out of solution by solidification. Heretofore it has been deemed more important to make steel as free as possible from certain of the chemically combined or the alloyed impurities—mainly phosphorus, sulphur, silicon and copper—and apart from oxide and blowholes, little or no attention has been paid to the mechanically held impurities. It is plain that mere chemical purity is not in the least a guarantee of mechanical excellence in steel. Indeed, it is not perfectly clear that there is any gain at all in quality over that of not excessively impure steels. (Dr. P. H. Dudley thinks that the poor quality of present day steel rails is due not to high phosphorus and sulphur, but to entrapped slag, and Professor Howe agrees with him.) Moreover, the probability of the mechanically held impurities being detrimental is one that has always been recognized, and has of late years been strongly indicated by experimental work. (Howarth, Andrews, Bannister, Rosenhain, Job, Snow, Fay, Howard, Wickhorst, Campbell and probably others of whom the writer is not aware.) Yet in spite of these considerations there has been compartively little effort that I am aware of to eliminate such impurities, oxide, blowholes and piping excepted.

Partial Correctives Now in Use.

It is true that it has been recommended to hold open hearth steel in the ladle as long as possible before teeming into the molds, in order to give these impurities a chance to rise to the top and escape or join the slag, but this is obviously an inadequate and risky performance. It is also true that thermite has been used by W. Mathesius to retard the solidification of steel in the mold, but this again, although an important improvement and far better than the first mentioned plan, is still somewhat inadequate and uncertain for these reasons: The heat of the thermite reaction is only at the top of the mold, and we cannot be sure that it will always penetrate to the bottom; the heat is not under control and perhaps not long enough continued at the critical point of solidification; and lastly, segregation and piping are only partly prevented in any case. Again, it is true that the Riemer process of preventing piping, where a blowpipe flame is applied to the top of the liquid steel in the mold, with the design of keeping the top of the ingot liquid, is a valuable and effective one (and incidentally also the preheating of the mold very effectually prevents segregation, it seems, and greatly lessens blowholes, but this process can have but little effect upon entangled slag. Moreover, it does not entirely accomplish its object of avoiding piping. The same criticisms doubtless also apply to the recent Hadfield patent, in which coal and blast of air replace the blowpipe flame of Riemer. Still, again, it is true that Krupp lined the upper part and Wellman the entire mold with nonconducting material. But although this is a step in the right direction, it is obviously nothing more and is far less important than the very great forward strides of Riemer and of Hadfield, just considered.

Finally, it is true that in the crucible and also in the electric process of making steel the molten steel is "killed" or allowed to stand liquid for a considerable time (and in Sejournet's process is cooled and remelted) before it is teemed, and it is to the relative freedom from oxide, slag and gases that the superiority of crucible and of electric steel is attributed. But as Stead has said: "It is a mistake to secure the greatest freedom from oxidation and slag in making steel, and then pour it through air into molds, which means oxidation and slag freshly formed." Moreover, in the crucible it is essential that the ferromanganese be added immediately before teeming. But the manganese silicate and sulphide thus formed do not always perhaps have time enough in that case to rise to the surface. Still another difficulty is that the gases thrown out of solution by solidification do not escape. Also segregation and piping in the ingot are not avoided.

Steel Must Be "Killed" In the Molds.

Whether we like it or not, there is obviously but one way to free steel from oxide, blowholes, gases, manganese silicate, sulphide and other slag, to prevent blisters, ghost lines and markings (except those that come from subsequent operations) in the finished steel, and avoid segregation and piping in the ingot We must kill in the molds. We must hold the steel liquid, after the addition of a deoxodizer (ferromanganese and ferrosilicon or high silicon ferromanganese, when the mold is basic lined), in an electrically heated and preheated refractory lined iron mold, or a graphite mold if small (the mold preferably if not inevitably basic lined in either case), and in a reducing atmosphere for a considerable time, in part at a temperature barely above, alternating with one barely below, the solidification point of the steel. Thus we give the gases, the manganese silicate and sulphide formed from the ferromanganese addition, and the common slag mixed in with the metal, all ample opportunity to rise to the surface. Afterward, to prevent segregation and piping, the heat playing on the outside of the graphite mold or on the top of the steel in the refractory lined iron mold, must be gradually lowered—that at the top last in the first case, so that piping will be lessened and segregation prevented, after which when the ingot is cold the pipe may be altogether destroyed by remelting the extreme top of the ingot and again cooling gradually. The mold, if a graphite one, after being sawed off at the bottom, may then be lifted from the ingot, or the mold may be seized by a machine and inverted (as must be done with an iron mold), thus dumping the ingot out from the top, with the advantage of having the mold at once ready for use again. But in that case, of course, the taper of the mold must be from top down and the steel must be top teemed, both of which steps are earnestly recommended by Howe.

It would seem that the best method of heating in the case of the graphite mold would probably be to have it surrounded at a convenient distance by a movable refractory lined screen and heated by electric arcs within this screen. The reducing atmosphere is probably best secured by a previously placed layer of charcoal at the bottom both within and without the mold, and mold and screen provided with a fire clay or fire clay lined cover. Or, if the mold is a refractory lined iron one, then the best method of heating would be by radiation from an arc inside the cover.

Making the Furnace the Mold.

Or an obvious corollary to this process would be to combine mold and furnace in one; that is, to melt and refine as well as kill and cool in the mold—in other words, to use the furnace as a mold, omitting the teem-

ing, and after removing the slag, killing the steel and remelting the top as above described, to dump out the cold ingot directly from the furnace. This would involve using, on the one hand, an electric furnace of such a type that, is in the Stassano, the bath is not agitated by a current of electricity passing through it (the mechanical agitation, of course, being stopped when the killing is started), or using, on the other hand, the old crucible principle, heating the crucible by electric arcs as above described, and preferably, if not inevitably, using a basic lining to avoid the continuous reduction of silicon from the crucible by the manganese and the carbon, and the continuous formation of carbon monoxide gas.

The points of difference in this process from the Stassano, on the one hand, or the old crucible process, on the other, would be: 1. The heat treatment. 2. The withdrawal of the steel from the furnace solid instead of liquid. 3. The elimination of molds and teeming. 4. A product absolutely, and not merely relatively, free from oxide, blowholes, slag, segregation and piping.

The practical difficulties to be apprehended would be "stickers," cracked walls, diminished output and increased cost. The first would not probably be more serious than now. The second also would not be more so than it is now in the open hearth ladle. With regard to the third, it must be understood that operations would not have to be suspended until the charge had entirely cooled down; but as soon as the heat was turned off the furnace could be withdrawn from the overhanging cover and electrodes and a freshly charged one substituted. As to the fourth, the cost would be no greater than in the present auxiliary electric.

Preventing Segregation by Gradual Cooling.

The statement made in the course of this description that segregation would be prevented by cooling gradually is one that would of course be disputed by most. The writer's reasons for believing it, in the face of the strong and plausible theory to the contrary, are briefly these:

In the first place, it must be remembered that testimony is not absolutely agreed on this point. Professor Howe, in the *Transactions* of the American Institute of Mining Engineers, 1907, p. 77, says that "the effect of ingot size and of the rate of cooling is in dispute;" and although the theory that slow cooling favors and rapid cooling hinders segregation is so strong and logical a one that he himself cannot but help advocate it, at the same time, with judicial and characteristic impartiality, he gives full weight to the opposing testimony of Talbot and of Campbell (Stevenson later also); cheerfully concedes (p. 81) that rapid cooling favors the onion type of solidification (free segregation) and slow cooling the landlocking type (nonsegregation, or at least hindered segregation); freely admits (p. 86) that in the majority of cases that have come to his notice rapid cooling increases axial segregation; and that he is holding the whole matter under advisement to give it further experiment pending a decided opinion.

On the other hand, the writer's cheerful confidence that slow cooling prevents segregation is based on these facts: The experiments of Talbot (*Journal* Iron and Steel Institute, 1905, Vol. 2), and those of Huston (*The Iron Age*, July 4, 1906), and *Journal of the Franklin Institute*, Vol. 165, No. 5), show that lateral segregation (the segregation from the outside toward the center) must be distinguished from vertical segregation—that from the bottom up. These two seeming to be totally unrelated phenomena. The former is due to the solidification of the iron squeezing out the more fusible and still liquid iron carbide, phosphide, &c., toward the center, and the latter is due merely to gravity. Lateral segregation occurs, like the chill in a piece of chilled iron, only to a certain distance inward—about one-fourth the way to the center of the ingot—and is obviously due to chill. Obviously also, it may be remarked, the chain of blowholes at this same distance from the sides and from the top and bottom is due to chill—that is, sudden cooling of the outside of the ingot.

There can be but one reason why for a distance about one-fourth in toward the center segregation is enormous and blowholes continuous, while from there in there is practically no lateral segregation (the middle top in some ingots being incomplete vertical segregation) and no blowholes. It must be in the sudden cooling of the outside layer. And if we prevent this sudden cooling and allow the outside one-fourth-to-the-center layer to cool as slowly as the inside now cools there will be no segregation and no blowholes here either. In actual practice the writer thinks that his scheme of preventing blowholes by holding the ingot alternately at a temperature just above and just below the solidification point of the steel would resolve itself into simply a slow and gradual cooling down of the surface.

Proofs from Practice.

Now is there anything in practice that justifies this rosy optimism? There is. In the Riemer process (*Iron and Coal Trades Review*, 1904), although the only measure taken to prevent the sudden chilling of the surface of the ingot is the preheating of the mold, yet there is no lateral segregation and no blowholes except at the extreme top. Again, some hint of the great difference in lateral segregation resulting from even a small difference in the cooling of the ingot may be found in a comparison of Mr. Talbot's two bottom poured ingots, as referred to above (pages 208 and 209 of his paper), with his top poured ingot (page 211). In the former the lateral one-fourth-to-the-center segregation is very marked; in the latter almost missing.

Another marked difference is in the vertical segregation. Coming now to this subject of vertical segregation, or better, "floatation," as Mr. Huston's term for it is: We see that here the slower the cooling the higher the position of the segregate, apparently; and the writer nourishes the pleasing hope that in very slow cooling along with top cooling last, such as he proposes (the latter already proposed by Professor Howe), the segregate may take itself clear out of the ingot, so to speak. This would indeed be a futile hope, if the upward rise was gradual. But we see that it is not gradual, but is a sudden jump at the middle or upper part, leaving the lower half or more of the ingot roughly uniform, except at the extreme bottom, where the chill exerts its influence in the same way as it does along the sides. In other words, it is only a certain proportion of the carbon, &c., that migrates upward, the bulk of it remaining entangled, it would seem, in the fir tree formation of crystals; therefore, if given time enough, this escaping detachment would reach the extreme top probably.

Considering Mr. Talbot's and Mr. Huston's experiments (with this theory in mind) we might reason thus with regard to the vertical segregation that we see there. In Mr. Talbot's bottom poured ingots (pages 208 and 209), the time of cooling—or what amounts to the same thing, the temperature of teeming—is such that the escaping carbides, phosphides, &c., get no further than the middle top, where they are ignominiously corraled in a body, the loyal legion remaining distributed throughout the rest of the ingot with rough uniformity, except, of course, for the one-fourth-to-the-center lateral segregation previously discussed. Again, in Mr. Talbot's slightly longer cooled top poured ingot (page 211), these escaping carbides, &c., although they form a much larger detachment, being swelled by the desertions from adjoining lateral areas that before had offered no opportunity for escape, still get no nearer the top.

But turning now to Mr. Huston's ingots (the remainder of Mr. Talbot's being spoiled for our purpose by the addition of aluminum, which, as Mr. Talbot is the first to point out, diminishes segregation remarkably), we find in test No. 6 the segregate raised to the top row of tests, although it is true that in No. 5 it is at least no higher than in Mr. Talbot's, while in test No. 2 it is nearly and in 3 and 4 altogether missing, although in these three as well as the others the lateral segregation is strongly in evidence. That is to say, these three tests were teemed cold, we may argue, and hence plenty of lateral but no vertical segregation, while No. 6 was teemed hot.

Going now to Mr. Riemer's experiments, we find that as a result of some hours' continued heating of the upper part of the ingot the segregation is quite at the top. Professor Howe argues that, although retarding the top cooling raises the segregate, slow cooling all over counterbalances this good by increasing the total upward segregation. And as a matter of fact, Mr. Talbot's top poured ingot (page 211) shows that total vertical segregation is increased by slow cooling; that is, the area of the segregate is enlarged. Yet in Mr. Huston's test No. 6 we see a segregate still greater in area, taking up the entire width and thickness of the ingot, exclusive of the one-fourth-to-the-center lateral rim, and nevertheless higher than in Mr. Talbot's ingot. So there is some warrant for the theory that although upward segregation would be greater in amount by slow cooling all over, it would be simply due to reinforcements from alongside outer areas, and the fir tree solidification, which is also promoted by slow cooling, would serve to intercept the escape of an undue proportion from any given area. That is, a greater number of vertical areas or outer layers would be induced to let go a proportion of their carbides, &c., by the slow cooling, but the proportion itself thus given up by each area would be, if anything, lessened by the stronger pine tree solidification tendency in that case; and if sufficient time were allowed, the whole segregate, however greatly enlarged, would inevitably gravitate to the extreme top.

With regard to piping, it would seem to a mere theorist that there is no real gain in squashing down the spongy oxidized top by main force, and as far as the effacement of blowholes by the same crude method is concerned, it is merely a superfluous forestalling of what takes place anyway in the various hammering and rolling processes afterwards.

Some Questions Concerning Electric Steel.

To sum up: Killing in the mold (making the furnace serve for a mold, if we care to do so) is an essential step in good steel making, and in these days of electrical development it is not an impossible one. But some unfavorable points in electric steel making that have recently been raised must be briefly discussed in this connection before closing. First comes Mr. Girod with the startling assertion at the Niagara Falls meeting of the Electro-Chemical Society, that as an auxiliary to the open hearth the electric furnace is no good, because something deleterious is acquired in the former that is not got rid of afterwards in the latter, and therefore the product is no better than otherwise. Then hardly have we recovered our breath before Mr. O. Thallner proceeds to finish it quite with the news that the electric furnace itself is no good except as a purifier, because the agitation of the bath from the current churns up the slag with it, and the product is inferior to crucible steel. He therefore, after passing the steel from the open hearth into the electric, again reverts to old principles by killing and finishing in a crucible, patenting this triple process. But a single ray of cheer pierces the gloom of this disclosure. The patenting of the crucible process in the year 1909 is an interesting and diverting achievement. Under more favorable circumstances Mr. Thallner's entire mixed process would be a source of unmixed delight. Let us not rudely jar our sensibilities by an abrupt cessation of this pleasing performance. Let us go on indefinitely adding alternation to alternation, not forgetting to take out a patent each time.

But Mr. Thallner hardly gets fairly under way in this delightful tail chasing round before he abandons it and contents himself with patenting the use of ferrosilicon in the auxiliary electric furnace. Thus he leaves us to infer that his previous troubles were due to fear of the action of ferrosilicon on the basic lining of this furnace and that therefore there was not enough silica in the charge to precipitate the oxides out of their solution in the steel; and that oxide it was, and not the churned up slag, that spoiled his steel. His own theory that it is the presence in the steel itself of a sufficient amount of silicon that gives crucible steel its structure and quality is a new one and not to be too eagerly assimilated.

But the point that Mr. Thallner raises will not down, although he himself abandons it. Certain it is that in types of the electric furnace where the current traverses the bath, absolute killing is impossible, and that therefore the Stassano form has a marked advantage over the others. Considering now Mr. Girod's point, we may wonder if the deleterious something that is taken up in the open hearth, and not given up in the auxiliary electric, is not, as in Mr. Thallner's case, oxide, for which Mr. Girod failed to provide enough silicon. Perhaps, like Mr. Thallner, he feared to use ferrosilicon, or enough of it; or perhaps his ferromanganese was low in silicon. Another explanation could, of course, be found in nitrogen; but although Braune and, quite recently, Stromeyer are enthusiastic in their conviction that very small percentages of this element have very great effect on steel, yet it is far from clear that they are right. As Professor Heyn remarks, it is uncertain "whether nitrogen itself is really the injurious element, or whether it is to be regarded merely as an indication of those harmful constituents which usually occur in conjunction with nitrogen (for instance, oxygen compounds)." And although it would seem a fact of very great significance that of Mr. Stromeyer's 26 steels, the 10 that either cracked or burst (5), or were supposed to be of bad quality (5), were the highest in nitrogen (or nitrogen plus phosphorus) of the lot. Yet this fact is robbed of much of its significance by other facts: 1. As Mr. Stromeyer is careful to point out, bending tests and shock tests on these 26 steels were not corroborative. That is, many of the 10 high nitrogen steels (at least half of them) showed very good, while many of the 16 low nitrogen steels showed very bad, indicating the cracks and breaks of the former to be due merely to local causes (slag, blowhole flaws, segregations, internal strains, &c.), and not to chemical composition. 2. As Mr. Saniter pointed out, it is possible to bring up cases of steels as high in nitrogen and phosphorus as Mr. Stromeyer's highest and that were neverthless good steels. 3. Harbord and Twynam, 13 years ago, could find no connection between nitrogen content and equality.

We are therefore slow to believe that it was nitrogen that made Mr. Girod's open hearth electric steels inferior to straight electric steels. As for hydrogen, it would seem to be too loosely held by the steel to serve as an explanation here.

The American Sheet & Tin Plate Company, Pittsburgh, has placed an order with Samuel W. Hay's Sons for a 15-ton Whitney electric crane, with 77-ft. span and 25-ft. lift, to be installed in its Scottdale Works, and has also placed an order with the Morgan Engineering Company, Alliance, Ohio, for a 15-ton electric traveling crane, 75-ft. span and 25-ft. lift, to be installed in its Sabraton Works.

A Washburn Machine for Spotting Planed Surfaces.

Scraping tool marks from small planed surfaces and subsequent frosting or spotting are expensive operations, distasteful to workmen, because they are tedious. The Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass., builds a great many sensitive drill presses and the cost of these operations on the posts is considerable. To reduce this expense Louis W. Rawson, the superintendent of the shops, has designed a machine which replaces the hand work, doing it automatically. Fig. 1 is a general view of the machine, Fig. 2 gives details of the mechanical construction, Fig. 3 shows the manner of holding the work, with filler pieces in place, and Fig. 4 a surface spotted; the unusual action of the abrasive wheel on the work is brought out clearly.

Originally it was intended to remove the planer marks by grinding, employing the special machine for frosting only, but it developed that this operation alone removed all tool marks, thus limiting hand scraping

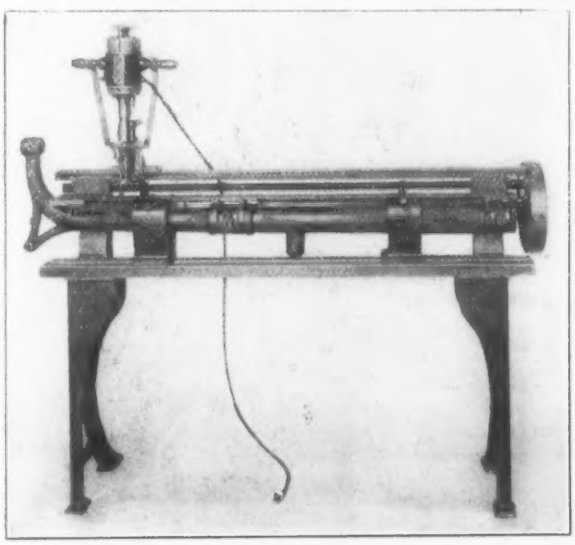


Fig. 1.—A Machine for Spotting Planed Surfaces Built at the Washburn Shops of the Worcester Polytechnic Institute.

to the head and round table bracket, where a fit is required.

In hand spotting a surface with the common half moon effect the workman moves the tool across the work at an angle of about 45 degrees, and repeats at right angles. In a machine these motions would require a complex reciprocating mechanism, and would necessitate going over the work twice. The accepted method was to go over and back and around in a circle. An oil stone is rotated at high speed, its spindle mounted eccentric in a sleeve, which in turn revolves on its center, and which, being carried in a rotating disk of larger diameter, moves in a circular path. There are thus three rotating motions—that of the disk, that of the sleeve and the revolution of the abrasive spindle. Combined with these motions is the feed of the head across the surface of the work. The rotating oil stone describes a small circle, and the path in which the center of this circle travels is also a circle. The result is a loop-like curve, or rather a succession of loops arranged in a circle, as shown in Fig. 4. Normally the oil stone would come to its original starting point, except for the slight movement of the longitudinal feed. A greater variation is procured by giving to the smaller circle, the sleeve, 11½ turns to one of the disk. This serves to cover the surface more completely. The longitudinal travel of the head plays no important part in the reproduction of hand

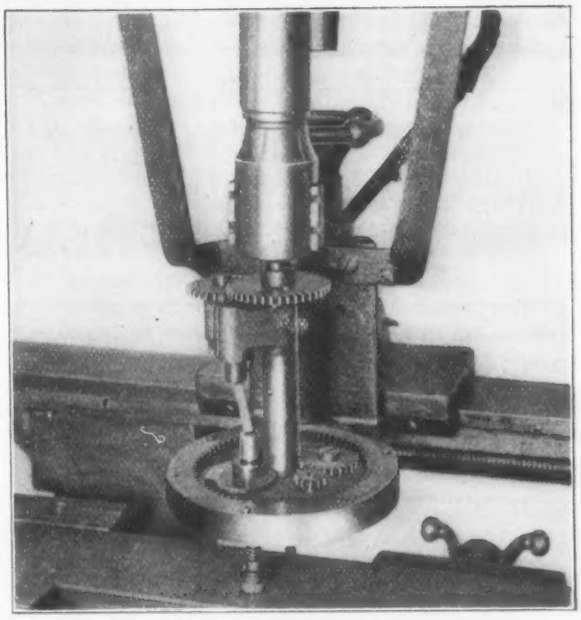


Fig. 2.—Details of the Grinding Head.

frosting. The figure may be varied. Changing the rate of feed produces a new effect, and the introduction of an intermediate gear reverses the direction of rotation, so that the series of loops have their pointed ends at the outside instead of the inside. The machine is designed to perform the operation upon a drill post in one-half hour, the time required for scraping on the head and round table brackets, but this rate can be increased by employing a second grinding wheel in an eccentric sleeve on the opposite side of the head.

The head is driven by an electric drill, which is the main spindle. The spindle runs in a sleeve, on the lower end of which is a disk having a bearing in the base casting. The spindle revolves at 500 rev. per min. and gearing multiples the speed of the ½-in. oil stone to 27,000 rev. per min. The motion is imparted to the wheel spindle by gearing and a universal joint shaft. A pinion at the lower end of the main spindle has two functions. From it one series of gears rotates the sleeve, carrying the wheel spindle, while a second series engages the internal gear, which is a part of the base casting, this motion rotating the sleeve in the larger disk. The head is fitted with gibs to a slide, and is driven longitudinally by a screw, which in turn is driven by a belt from a pulley at the foot of the machine. The connection of the screw and head is a hinged half nut, which is easily raised out of engagement, so that the head may be moved to any desired position on the slide. When spotting the screw is automatically released by a knock-off when the work is

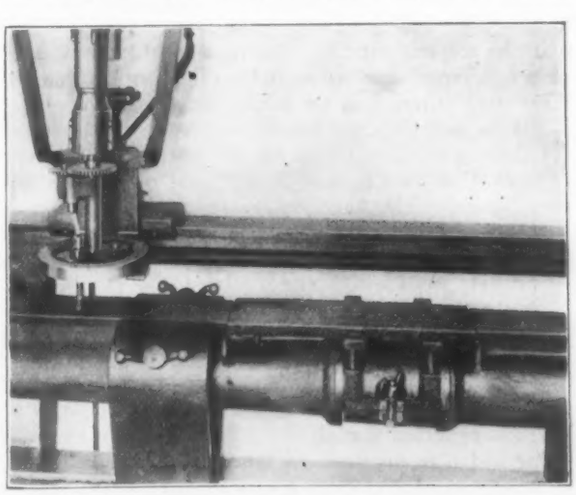


Fig 3.—How the Work Is Held.

completed. The principal difficulty in designing the machine lay in the narrowness of the surface of the

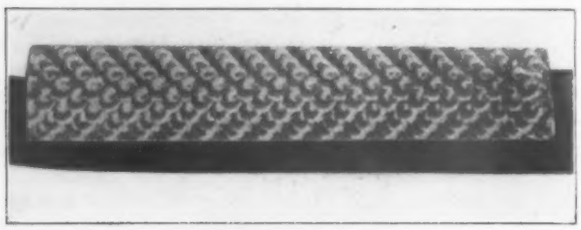


Fig. 4.—An Example of the Work Done by the Washburn Spotting Machine.

column, the width being only 2½ in., within which limit the entire working mechanism had to be kept.

The wheel is held at an even tension against the work by a spiral spring. This requires the use of filler pieces in the fixture which holds the work, so that the wheel may travel over the entire distance of the planed surfaces, including the intervening gap. Were it not for these pieces the spring of the wheel spindle would depress it in the gap, and it could not ride to the surface beyond. The filler pieces are hinged to clamp on the turned spots of the column, and have adjusting screws with springs, so that the surface may readily be brought even with those of the work. The post is supported in two holders on the ways of the planed surfaces. It is an easy matter to remove the fillers and release the post at the completion of the work.

It is expected that five of the 10 new hot tin mills being added to the plant of the McKeesport Tin Plate Company at McKeesport, Pa., will be ready for operation early in March, and the other five about May 1.

A Newton Multiple Spindle Milling Machine.

A four-spindle milling machine recently built by the Newton Machine Tool Works, Philadelphia, Pa., to meet special requirements of the purchaser and which possesses all the prominent features necessary to the economical finishing of parts by milling, is illustrated in the two accompanying views. Fig. 1 shows the operating side and Fig. 2 the driving side. The size of the machine while not so impressive as that of some others turned out from the shops of this concern is nevertheless worthy of mention. The table is 23 in. wide, 17 ft. 6 in. long over all, and work not exceeding 16 ft. in length can be milled. The distance between uprights is 30 in. and the work table is entirely surrounded by an oil pan.

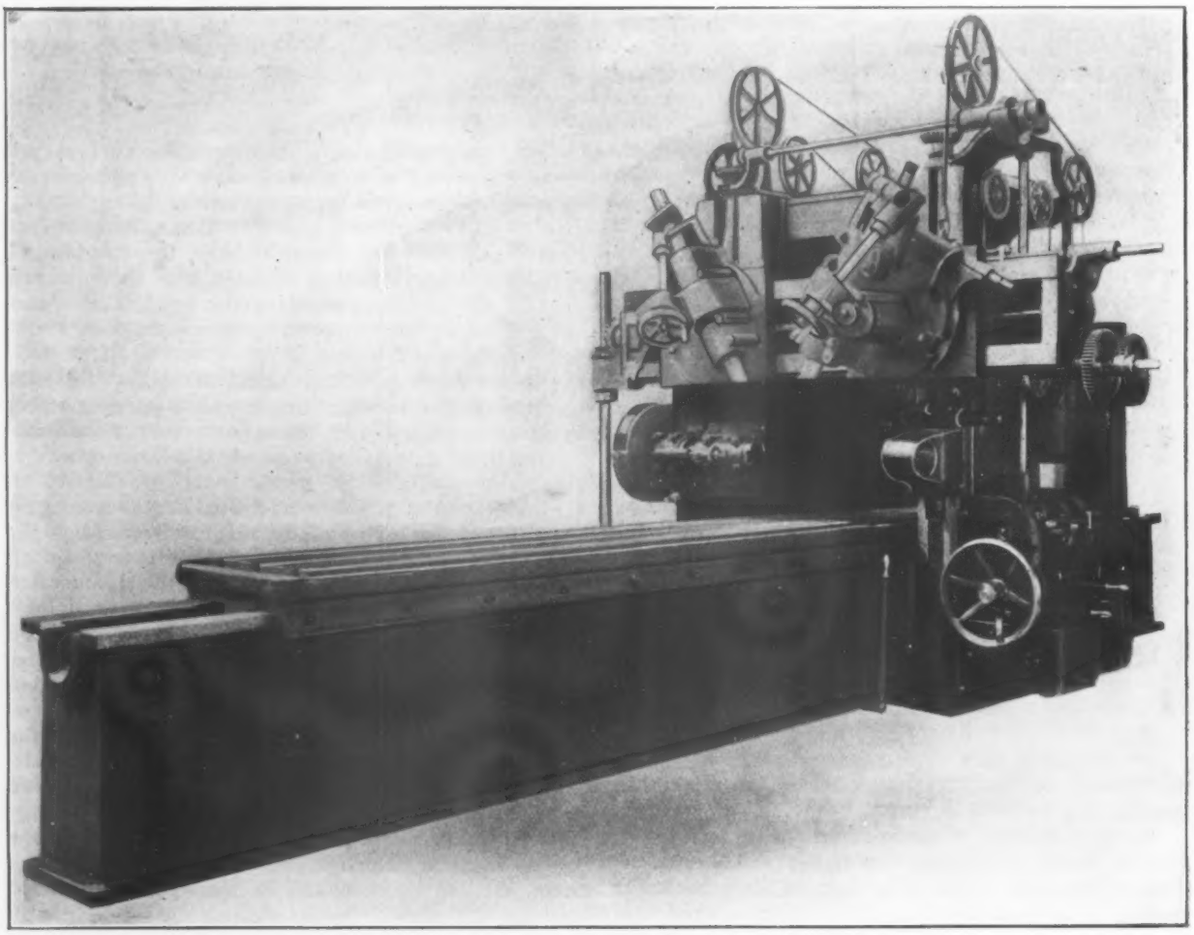


Fig. 1.—Operating Side of a Special Four-Spindle Milling Machine Built by the Newton Machine Tool Works, Philadelphia.

The vertical spindles of this machine are 3½ in. in diameter and are fitted with No. 5 Morse taper sockets. The cutters are held in position on the spindle by a through retaining bolt and the driving is accomplished by a broad face key. These spindles are mounted in sleeves revolving in brass bushed capped bearings having lengths of 9¾ and 9 in. respectively for the individual bearings and an over all length of 24 in. directly in front of the rail, with a support located on top of the saddle for the spiral elevating worm. The drive is by a coarse pitch toothed bronze worm wheel fitted with thrust washers mounted between the two bearings. The driving worm is of hardened steel with roller thrust bearings encased to provide continuous lubrication, while the vertical thrust is taken by a roller thrust bearing located between the spindle and the bronze rack sleeve.

The independent vertical hand adjustment is controlled by the hand wheel shown in Fig. 1, on which

adjustable washers graduated with 435 divisions are mounted. Each of these divisions together with the pitch of the spiral gear is equivalent to a vertical adjustment of 0.001 in. As will be noticed by comparing the two views, the saddles are mounted on slides and are arranged to swivel through an angle of 45 degrees. The motion for the drive is therefore carried through the cross rail to the spindle through the center of the saddle, bevel gears being employed to make connection to the worm shaft.

The cross rail slides are fitted to the rail with square lock gibbed bearings and adjustments are made by taper shoes. The left hand head has reversing cross feed and fast power traverse, and the right hand head has a hand adjustment only. The cross rail is counterweighted and has reversing vertical feeds and fast power traverse.

The horizontal spindles are 4 in. in diameter in the main bearing and 3⅝ in. in the sleeve driving worm wheel bearing, and are fitted with No. 4 Morse taper sockets. The arrangement for driving the cutters is the same as on the vertical spindles. The spindles are mounted in bronze bushed capped bearings on the auxiliary slide and each has an independent horizontal adjustment of 8 in. for convenience in setting the cutters. This adjustment is controlled by an adjusting screw on which a graduated collar is mounted which gives a movement as small as 0.001 in. The spindles are driven by a sleeve worm wheel having a bronze ring with teeth of steep lead and a driving worm of hardened steel with roller thrust encased bearings. The saddle on which the spindle is mounted is counterweighted and arranged for either independent hand elevation or elevation in unison with the cross rail when attached by means of the swinging bolts provided. The outboard bearing furnished for supporting an arbor in the horizontal spindle is also equipped with a counterweight and provision for elevation either in unison or independently of the cross rail. This bearing is arranged with a taper external and parallel internal bearing with nuts to compensate for wear.

The power for driving the spindles is furnished by a General Electric type CR-20 15-hp. motor, making from 410 to 1640 rev. per min. This power is transmitted from the main driving shaft to the spindles through an intermediate rawhide gear. Back gears mounted on this shaft give a speed reduction of two to one when in mesh. The drive to both the horizontal and vertical spindles is clutched, thus permitting either independent or simultaneous operation.

The work table has a spiral gear and rack drive with nine changes of geared feed, ranging from ½ to 8 in. per minute and reversing fast traverse and fast feed to the work table, cross rail and to the left hand head on the cross rail. All of these operations are controlled by four levers, and the hand adjustment of the work table and cross rail is controlled by a hand wheel. The floor space required by one of these machines is about 8 x 24 ft. If desired the machine can be furnished for belt drive.

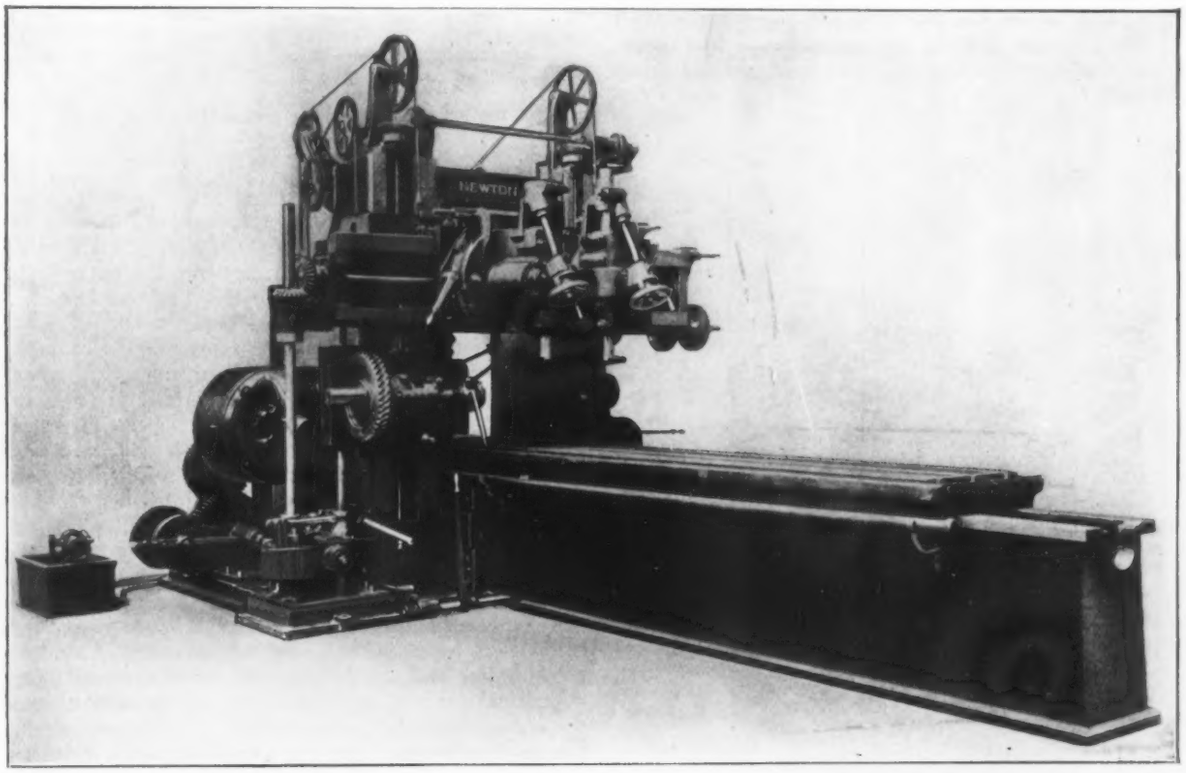


Fig. 2.—Driving Side of the Newton Special Four-Spindle Milling Machine.

New Railroad Building in 1909.

Returns from a majority of the railroad companies of the country, supplemented by figures from state railroad commissions and from the records of the *Railroad Age Gazette*, are the basis of the estimate that 3748 miles of new main track was built in the United States in 1909, as compared with 3214 miles in 1908. The 1908 record was the smallest since 1987, when 2109 miles was built. The above figures do not include new second, third or fourth track, sidings or electric lines. The following table compiled by the journal above named shows the mileage built in the United States in the past 17 years:

1893.....3,024	1899.....4 569	1905.....4,388
1894.....1,760	1900.....4,894	1906.....5,623
1895.....1,428	1901.....5,368	1907.....5,212
1896.....1,692	1902.....6,026	1908.....3,214
1897.....2,109	1903.....5,652	1909.....3,748
1898.....3,265	1904.....3,832	

The Board of Trade of Vincennes, Ind., at a special meeting decided to raise at once a factory fund of $150,000 by the sale of factory site lots. Edward Watson is president of the board.

The Hydro Recording Volume and Velocity Gauge.

It is difficult to satisfactorily measure large volumes of air and gas with the usual types of gas meters, and the need of such measurements exists in many important industries. Among those requiring an instrument of this character are the blast furnace managers, to know the gas consumed in boilers, stoves and gas engines; the gas engineer, to know the quantity and uniformity of flow of gas from producers; and the mine superintendent, to measure the output of fans and quantity of air delivered to the pits. The common faults of apparatus employed for the purpose are that they are either too complicated or else unreliable.

A radical departure in instruments of its kind is the Hydro volume and velocity gauge, made by the Hydro Mfg. Company, 720 Lewis Block, Pittsburgh, Pa. It is claimed that the application of the hydrodynamic principle has resulted in greatly simplifying the construction and producing an instrument that is durable, accurate, reliable and sensitive. Fig. 1 shows the external appearance of the gauge, while Fig. 2 gives some idea of the construction.

The principal part of the apparatus is two cylindrical compartments arranged one inside of the other and both partly filled with liquids; the inner one is the

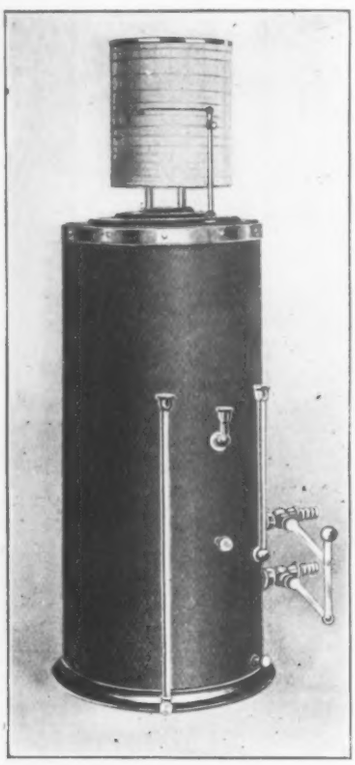


Fig. 1.—The Recording Volume and Velocity Gauge Made by the Hydro Mfg. Company, Pittsburgh, Pa.

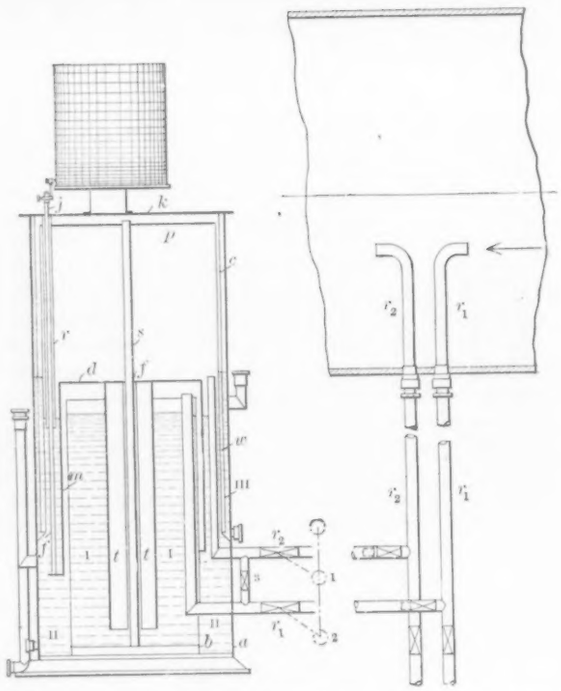


Fig. 2.—Section of the Gauge and Connections with the Point of Measurement.

operating medium while the outer acts as a water seal. The inner liquid I (Fig. 2) carries a float *t*, the top of which is fastened to an inverted cup shaped cylinder *d*. The lower rim *m* of the latter dips into the outer sealing liquid II. Two independent gas chambers are thus formed, of varying capacity, depending upon the depth of immersion of the bell, which varies with the changes of pressures within and without. To serve as a guide for the operating bell a rod, *s*, is centrally fastened to the bottom of the main cylinder and its upper end passes through the removable cover plate *p*. Moving with the float or bell is a second rod, *j*, which is hinged to the lower portion of the bell and passes through a tube, *r*. The top of this tube forms an airtight joint with the cover and the other end dips into the sealing liquid II. The upper end of the rod *j* carries a pen that bears against a rotating cylinder operated by clockwork and thereby traces a line which is a measure of the difference in pressure between the two compartments. An additional water seal, *w*, is provided for the cover by a cylindrical projection, *c*, that extends downward into the sealing liquid III in an annular space formed within the upper portion of the main body.

Communication between the gas main and the apparatus is established by two pipes r_1, leading into the space below, and r_2, into the space above the movable bell. Each of the pipes is provided with a stop cock and both are linked together to make them work simultaneously. In this way it is possible to admit pressure to both sides of the bell at the same time. A three-

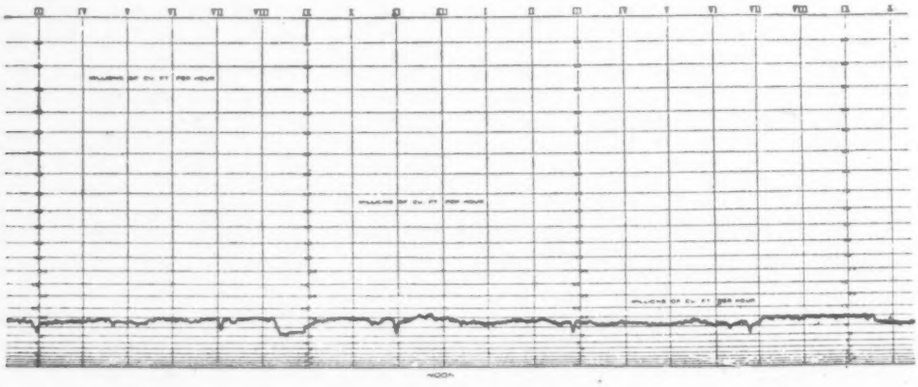


Fig. 3.—Typical Chart from the Hydro Gauge.

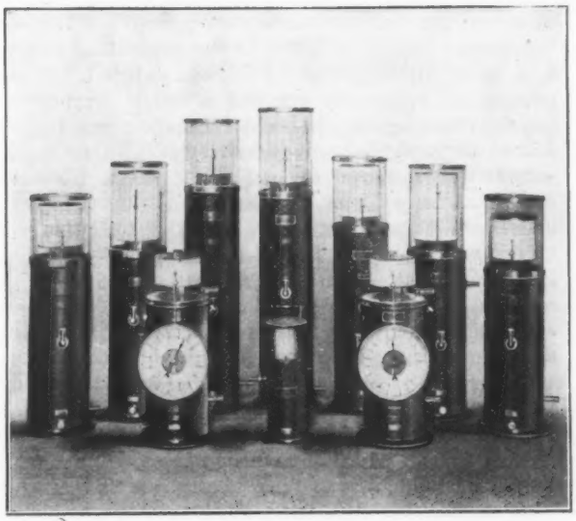


Fig. 4.—A Group of Hydrostatic Gauges for Recording the Pressure, Draft, Velocity and Volume of Gases.

way cock serves to connect both air spaces in the apparatus with the atmosphere. The filling of the three independent liquid chambers is accomplished through pipes that lead out from the main body of the apparatus.

The relation existing between the pressure and velocity of the gas as recorded by the gauge is expressed by the formula

$$p + h - (p - 0.37h) = 1.37h = 1.37 \frac{v^2}{2g} s$$

in which p is the static pressure or vacuum in inches of water at the point of the pipe line where the velocity is to be measured, h the dynamic pressure in inches at the same point $= \frac{v^2}{2g} s$

in which v is the velocity in feet per second, g the acceleration of gravity (32.2 feet per second) and s the specific gravity of the fluid.

Inserting a bent tube with the opening toward the direction of the flow of the fluid and measuring the pressure at the other end would register the sum of the static and dynamic pressures at that point and give the first two quantities in the formula. With another tube having its opening in the same direction as the flow, values are obtained for the quantity in the parenthesis, *i.e.*, the static pressure alone. These two pressures are transmitted to the gauge portion of the apparatus in such a way that the greater acts within the space below the bell d and the lesser one within the space above it, and the difference between these two pressures causes the movement of the bell. As the static pressure is the same both above and below the bell the working of the gauge depends solely upon the differences in the dynamic pressure. This difference is multiplied many times by the gauge with mathematical accuracy and recorded on a chart such as is shown in Fig. 3.

This same hydrodynamic principle is employed in the operation of other types of gauges made by this firm, such as a gas draft recorder, a gas pressure recorder and an instrument combining both. A group of these gauges for recording the pressure, draft, velocity and volume of gaseous liquids is shown in Fig. 4.

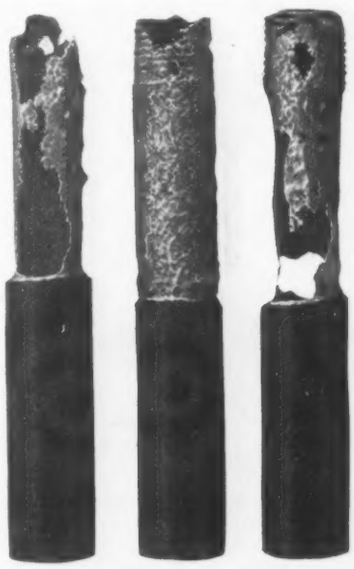
Owing to the rapid extension of business on its Ronson wrench, the Ronson Specialty Company, 7 to 15 Mulberry street, Newark, N. J., is taking care of the distribution outside of Greater New York and Long Island. While Cryder & Co., Sixty-third street and Park avenue, New York City, have formerly been sole selling agents, they will now continue to act as sole distributors in the territory above referred to, where the business is of such importance as to necessitate their undivided attention.

Highland Non-Corrosive Coating.

A coating for piping or other iron or steel work to protect it from corroding influences, has been placed on the market by the Highland Chemical Products Company, Connellsville, Pa. This compound, to which the trade name Highland non-corrosive coating has been given, is intended principally to prevent mine water from destroying the pipe lines and fittings used in the underground passages. Applied like any ordinary paint, it forms a protective blanket over the surface covered and is a chemical combination that is not affected by the acids or other deleterious substances found in mine water.

In the accompanying engraving are shown three nipples that were partly coated with this compound and then placed in a mine in the Connellsville region, where the water was particularly bad. The views show very clearly how the destructive action of the water was resisted by the coating.

In about 15 minutes after application, the coating dries with a hard glossy, enamel-like finish, which it is stated will not be eroded even by gritty mine water



Pieces of Pipe Subjected to the Corrosive Action of Mine Water, Showing the Integrity of the Parts Protected with Highland Non-corrosive Coating.

under heavy pressure or at the elbows where the scouring action is more pronounced. If it becomes necessary to cut an existing line of pipe to make new connections, a daub of the coating before reconnecting will render the new threads proof against corrosion. The coating is equally useful on the iron parts of cages, pit cars, &c., and will also prevent the decay of wooden discharge lines.

The application of the coating is a quick and inexpensive operation. An ordinary brush like that used in painting is employed, care being taken that no exposed surfaces of iron are left where the mine water can begin its destructive work. To guard against these exposed surfaces more effectively the manufacturers suggest dipping the pipe in a bath of the coating aside from the fact that it is probably both cheaper and quicker than the brush. The coating dries very rapidly. No settling out of any of the ingredients occurs so that it is not necessary to stir the mixture each time any is used. Daubing the threads of both members when making connections will produce a joint that should not rust or leak.

For coating pipe dipping is preferred to painting, as it insures a complete coating of the pipe and is necessary where the inside surface has to be protected. For satisfactorily performing this operation, the manufacturer recommends constructing a trough

of tight boards and dipping the pipes in a bath of the coating one at a time. As the pipes are lifted out of the bath the surplus coating should be allowed to drain back into the trough and the pipes inclined against a building or fence so that as little as possible of the coated pipe comes in contact with other surfaces. In about 10 minutes the coating will have dried sufficiently to permit handling and care should be taken to daub any places that have become rubbed clean in handling before they were dry.

This compound is put up in barrels of 52 gal., half barrels of 30 gal. and 16-gal. kegs.

Benjamin Electric Lighting Specialties.

Some electric lighting specialties particularly adapted for shop and factory illumination are offered by the Benjamin Electric Mfg. Company, 507 West Jackson Boulevard, Chicago, Ill. Fig. 1 shows an indoor wireless tungsten ceiling cluster fixture, to which the trade name Banner has been applied. This consists of the cluster, a standard 12-in. stem of ⅜-in. iron pipe covered with ¾-in. brass tubing, a 16-in. deeply hooded enameled steel reflector, a 4 x 4½-in. canopy, and crowfoot. Two, three, four and five-light fixtures are made; 100-watt lamps being used in the three smaller sizes and 40 or 60-watt lamps in the other. Burnished brass is the standard finish.

Fig. 1.—Indoor Cluster.

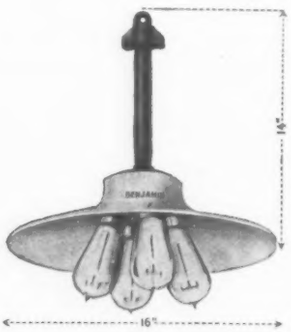


Fig. 2.—Outdoor Cluster.

Fig. 3.—Shock Absorber.

Tungsten Light Clusters and Shock Absorbing Hanger Made by the Benjamin Electric Mfg. Company, Chicago, Ill.

In the weatherproof fixture shown in Fig. 2 the cluster shell is of aluminum and the stem is the standard 8-in. length of ½-in. iron conduit, with a suspension fitting. The reflector and cluster are attached to each other by a flange and the joint is made watertight by two rubber gaskets. This is also made in four sizes to accommodate from two or five lights.

In both these fixtures the outlets make an angle of 16 degrees with the vertical; this slight angle does not endanger the filaments of the lamps, but adds materially to the lighting efficiency of the fixture, as less light from one lamp passes through the others.

In Fig. 3 is given a sectional view of a shock absorber that consists primarily of a strap iron stirrup and a centrally located loose bushing, supported by a coiled spring and tapped to receive the fixture stem. The compression spring forms a resilient connection between the support and the fixture. The stirrup has two feet provided with screw holes for attaching to the supporting surface, and takes the place of the crowfoot ordinarily employed. An additional strap centrally threaded to fit a ⅜-in. insulating joint is attached to the stirrup by two screws. This strap may be omitted for attaching the fixture to a wooden ceiling or block. In one case the device becomes a shock-absorbing hickey, and in the other a shock-absorbing crowfoot.

For use with brass casing and canopy, a canopy support of ⅞-in. brass tubing, with the upper end flanged outwardly, passes through the opening in the bottom of the stirrup and surrounds the bushing. In this way the canopy can be attached to the supporting element by a ⅞-in. slip ring, thus leaving the fixture freely suspended and effectually provides a means for preventing the transmission of shocks from the support to the fixture through the canopy and stem. There is also enough play between the movable parts to allow the fixture to hang plumb, although the support may be uneven. Machine screws are provided on either side of the stirrup, whose function is to keep the bushing from being displaced. These screws can, however, be removed and the absorber taken apart for the purpose of changing the springs or for removing or inserting the canopy support corresponding with the fixture. Three grades of springs are furnished with the device. These all vary in stiffness according to the weight of the fixture with which the absorber is to be used. The lightest spring is for fixtures weighing from 1 to 4 lb., the medium from 4 to 10 lb. and the stiffest from 10 to 16 lb.

In addition to the other desirable features this shock absorber incorporates an essential for successful devices of this character, as provision is made for absorbing the shock at the point of support of the entire fixture instead of above each individual lamp socket. The initial shock of a sudden or sharp jar from the ceiling is intercepted before it reaches the fixture proper, and any subsequent vibrations that might be transmitted are dissipated by the inertia resulting from the weight of the fixture before reaching the lamps themselves.

Copper Production and Stocks.

The monthly statement of the Copper Producers' Association, issued January 10, shows a reduction on January 1 in the stock of marketable copper of all kinds on hand at all points in the United States of 11,237,416 lb. when compared with the stock on hand on December 1, 1909. Following is the statement in full:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in United States, December 1	153,003,527
Production of marketable copper in United States from all domestic and foreign sources in December	117,828,655
Deliveries of marketable copper in December:	
For domestic consumption	69,519,501
For export	59,546,570
	129,066,071
Stock of marketable copper of all kinds on hand at all points in United States, January 1	141,766,111

Statistics for the entire year 1909 are also given, as follows:

	Pounds.
Total production, 1909	1,405,403,056
Total deliveries, 1909:	
For domestic consumption	705,051,591
For export	680,942,620
	1,385,994,211

Foundry Coke.

A German Discussion.

Prof. Oscar Simmersbach, of Breslau, delivered an address recently on this important subject before the convention of the German Foundrymen's Association. He explained the difference between foundry and furnace coke, so far as quality is concerned, in the selection of the best portions of an oven charge for foundry use, this necessarily increasing the cost, as more labor is required. Now if the foundry gets the better quality coke, the blast furnace would naturally be supposed to get poorer material. Investigations made on 36 varieties of blast furnace coke and 26 foundry cokes, taken from Rheinish-Westphalia, by Drs. Wuest and Ott, show that this is not the case. In fact, of 17 collieries selling both foundry and furnace coke, but two show a lower ash content for their foundry coke, while the other 15 show the reverse. So far as sulphur is concerned, five show less for foundry coke and 12 the reverse. Fixed carbon finds 13 of the collieries sending out foundry coke with lower percentages of this item than blast furnace coke. It will thus be seen that a selection of the best looking coke for foundry consumption does not always mean better quality.

Physical Structure.

As the cupola melting process has only the melting of iron for its object and no chemical reduction, it is necessary to utilize all the heat values possible. This means as complete a burning of the carbon to carbonic acid as possible. To accomplish this there should be a comparatively small surface of coke presented to the oxygen of the blast. In the blast furnace the reverse is the case, large surfaces of coke presented to the oxygen giving a maximum of carbonic oxide.

The physical structure of foundry coke is therefore an important item to be considered. A porous coke takes up a proportionately larger volume of the cupola than a denser one. There is a greater surface presented to the blast, and moreover the reaction is stronger as the penetration of the air is deeper; hence the production of too much carbonic oxide. In the case of dense coke, a smaller surface being presented, the oxygen cannot take up much carbon, the reaction is lighter, as the burning is on the surface only, and the consequence is a better chance for the production of carbonic acid. Foundry coke should, therefore, be as dense as possible. It is not to be forgotten that a dense coke requires more blast than a porous one, and with the greater amount of air goes the larger percentage of carbonic acid.

The blast pressure should be light, to prevent interior burning of the coke as much as possible. This also distributes the air better, if the cupola section is large, and in so doing gives the ogygen a greater surface for the formation of carbonic acid. Preheating the air is not to be recommended, as it promotes the union of carbon with oxygen with the formation of greater quantities of carbonic oxide.

The porosity of a coke depends upon the character of the cells. If these are large individually, we call the coke a porous one; if small, the coke is termed dense. The cells have nothing to do with the strength of the coke. This depends upon the character of the cell walls. If the walls are hard, the coke, even if porous, is a hard one. If the cell walls are soft, the densest coke can be easily crushed.

The cell structure of coke is affected by several things. The finer and more uniform the grain of the coking coal, the denser the coke is apt to be, and *vice versa*. Similarly, the composition of the coal, the temperature of coking, and length of the heat, affect the density of the product. The more volatile matter and moisture in the coal, the quicker and higher the heating, the greater the porosity of the coke. On the other hand, the heavier the pressure, the denser the coke. Stamped coal always makes denser coke than loose coal. The cell structure of coke varies between 25 and 55 per cent. of its volume. Foundry coke should not exceed 40 per cent. in cellular space, and is better the nearer it approaches 25 per cent.

The weight of a coke is not a guarantee for its density, for other things, such as ash content and the composition of the ash also affect this. Cokes of the same density may have entirely different weights, and a dense coke may be lighter than a coke with double the cellular structure. Of two cokes with different specific gravities, the heavier one gives a more uniform heat and melts more iron. The lighter coke burns faster and gives a more intense heat for the time being. The result, however, is a too rapid lowering of the bed with burning iron as the result. Good foundry coke should not be lower than 1.8 in specific gravity.

Melting Value.

The second consideration in foundry coke should be its melting value. This is influenced by the ash and moisture content directly and indirectly. The ash in coke depends upon that of the coal it is made from. A 5 per cent. ash in coal ordinarily means 6.67 per cent. in coke. The less the ash in coke, the greater the fixed carbon and consequently the melting value. There is also less limestone necessary to slag off the ash, an item amounting to something annually in large foundries. Occasionally the ash in coke is of such a composition that it fluxes itself, and then no limestone is necessary.

Moisture in coke affects its melting value. The lighter the coke, the more apt it is to have high moisture percentages. A dense coke, having less pores into which the water can penetrate, is not so high in moisture. Bee-hive oven coke, with its smoother surface, is not so apt to take up water as by-product coke. Coke made from stamped coal may run as low as 2 per cent. in water, while by-product coke made from loose coal may run as high as 15 per cent. This is particularly the case when there is a car shortage and the coke is dumped in rapidly without care in quenching, or where quenching is done at night, and the glow of the red hot coke is so perceptible that quenching is carried on too long.

Freedom from Deleterious Matter.

Finally, freedom from deleterious ingredients is desirable in foundry coke. Sulphur is naturally the chief enemy to be considered. It occurs in coal in three forms: principally as pyrites; then in the form of organic sulphur compounds, that is in combination with carbon, oxygen and hydrogen; in smallest measure it occurs as a sulphate. Washing the coal removes a considerable portion of the pyrites, though much remains very finely divided in the coal. In the coking process the pyrites is decomposed and part of the sulphur escapes. The other portion unites with the iron compounds in the ash, and is thus retained. It seems that even at low temperatures the iron compounds in the ash are reduced to metallic iron, and this at once picks up and combines with any free sulphur, or similarly the sulphur of the organic compounds. Any free iron or lime that may be available in the ash takes this up, and consequently the sulphur in the coke made is affected greatly by the iron and lime content of the ash. The sulphates, or gypsum, in coal for the greater part remain in the coke. Sulphate of lime is reduced to the sulphide. In the quenching of the coke, some of the sulphur is liberated, but this is not large, especially where the coke is quite dense. There are organic sulphur compounds left in the coke, in spite of the firing process. Free sulphur has never been found in coke, and hence there is nothing in the theory of occluded sulphur in coke.

A coke fairly high in sulphur will quickly show it when exposed to the air for a short time. The

brown spots, with edges all colors of the rainbow, are plain evidence. Sulphur is very dangerous in the cupola, going down unchanged in the coke until gasified at the tuyeres. The gases contain sulphur as an oxide, but this is reduced subsequently, and goes into the iron as a sulphide. Some of the sulphide of iron, when manganese is present in some quantity and the temperature is high, combines with this and may thus be gotton out of the way. But the better reaction is where lime is available, and the contact of sulphide of iron with carbon and lime at high temperatures forms a sulphide of lime, thus removing it from the iron. A high temperature and enough lime will give excellent results. In general, coke should not contain more than 1 per cent. of sulphur. Phosphorus is usually present in so small a quantity that it may be neglected for foundry purposes.

The commission for establishing standard specifications for Ruhr foundry coke has provided for two classes of coke, as follows:

	First quality. Per cent.	Second quality. Per cent.
Moisture, maximum	5	5
Ash, maximum	8	9
Sulphur, maximum	1	1.25

The water is certainly generous in these requirements. The ash is taken this low because the majority of collieries can make their coke with less than 8 per cent. ash in the Ruhr region.

Traffic of the Great Lakes in 1909.

The statement of lake commerce through the canals at Sault Ste. Marie, Michigan and Ontario in the season of 1909 is interesting for its comparisons with the season of 1907, when practically the same volume of traffic passed through the locks of the American and Canadian canals. While 1907 showed a greater total than 1909—namely 58,217,214 net tons, against 57,895,149—the past year was notable for a record in iron ore tonnage, the total being 40,014,978 net tons, against 39,594,944 in 1907. The official statistics, recently issued, make comparisons with the season of 1908, and, as is well known, the increases last year were pronounced. The figures are as follows:

	Total traffic. Season 1908.	Season 1909.	Increase. Per ct
Vessels:			
Steamers, number	12,553	16,463	31
Sailing, number	1,355	1,787	32
Unregistered, number	1,273	954	—25
Totals, number	15,181	19,204	26
Lockages, number	10,685	13,571	27
Tonnage:			
Registered, net	31,091,730	46,751,717	50
Freight, net	41,390,557	57,895,149	40
Passengers, number	53,287	59,948	13
Coal:			
Hard, net tons	1,384,743	1,412,387	2
Soft, net tons	8,517,717	8,527,639	..
Flour, barrels	5,704,375	7,094,175	24
Wheat, bushels	106,041,873	113,253,561	7
Grain, bushels	43,458,583	46,519,451	7
Manufactured and pig iron, net tons	289,308	522,281	81
Salt, barrels	547,223	651,091	19
Copper, net tons	101,735	127,212	25
Iron ore, net tons	24,650,340	40,014,978	62
Lumber, M. ft. B. M.	453,761	552,380	22
Building stone, net tons	1,019	1,784	75
General merchandise, net tons	842,901	1,140,344	35

The United States canal was opened April 20 and closed December 11, 1909, making a season of 236 days. The Canadian canal was opened April 21 and closed December 16, 1909, making a season of 240 days.

The Toronto Plant of the Standard Sanitary Mfg. Company.—The Standard Sanitary Mfg. Company, with offices in the Bessemer Building, Pittsburgh, and plants in Louisville, Ky., New Brighton, Pa., and Pittsburgh, is making rapid progress on the new plant it is building at Toronto, Ontario, Canada. The buildings will be of reinforced concrete construction. The new plant is located on a five-acre tract and when completed will have a capacity of 150 bath tubs a day. Orders have been placed for a part of the equipment for the plant and the remainder will be ordered this month. The company has also prepared plans for a new brass foundry at Louisville, which will have double the capacity of the plant now at that place. The intention of the company is to separate the brass casting and sanitary departments and operate them independently of each other.

The Cutler-Hammer Mfg. Company's New York Factory.

The importance attained in manufacturing by the Middle West is indicated by the increasing number of concerns in that section which have found it necessary to establish Eastern factories. The latest of the more important manufacturers to do this is the Cutler-Hammer Mfg. Company, Milwaukee, Wis., whose plant in that city is now claimed to be the largest in the world devoted exclusively to the manufacture of electric controlling devices. This company has just completed the erection of a factory in New York City, the building being located in the Borough of the Bronx, facing on Southern Boulevard, 144th street and Timpson place.

This new factory is five stories in hight, contains about 100,000 sq. ft. of floor space and is of steel and brick construction throughout. Electric current for light and power is furnished by the New York Edison Company, but provision is also made for an isolated, steam-driven electric plant in the basement of the building. The factory also possesses a complete equipment for transforming the alternating current furnished by the electric company into direct current, the latter being preferable for the operation of machine tools. The building is equipped with a thoroughly modern sprinkler system, including roof storage tanks of 50,000 gal. capacity, and a 100 h. p. electrically operated centrifugal fire pump with its 50,000 gal. cistern in addition.

The size, with the substantial construction of the building, the excellent light afforded by reason of its location on three streets and the complete electrical equipment for light and power make the Eastern plant of the Cutler-Hammer Mfg. Company one of the finest factory buildings in New York City. The building, in design and construction, is the work of the Worden-Allen Company, Milwaukee, whose success in construction work of this nature has led it to extend its operations to New York and Chicago, in both of which cities the company has recently opened offices for the convenience of its clients.

The H. C. Frick Coke Company Buys Coal Lands.—At Uniontown, Pa., last week, a deed was filed for record conveying 2,644 acres of coking coal situated in Luzerne Township, Fayette County, to the H. C. Frick Coke Company, Pittsburgh, by the Clairton Furnace Company, at $850 per acre. The property adjoins those of the Isabelle Connellsville Coke Company, Republic-Connellsville Coke Company and Thompson-Connellsville Coke Company, and has a frontage over a mile long on the Monongahela River, the Monogahela Railroad passing through it. The total consideration was about $2,500,000, which is said to have been paid in cash, constituting the largest cash deal ever made in Fayette County coal. Coal men also say that the price per acre is the highest ever paid in cash for coking coal in that locality. The same property was sold to the present vendor in 1903 by J. V. Thompson, of Uniontown, at about $475 per acre.

Bars for Concrete Reinforcement.

The Most Advantageous Form and Quality of Steel.

A paper read before the Engineers' Society of Pennsylvania by J. H. Toupet, chief engineer of the Electric Welding Company, McKees Rocks, Pa., on "Deformed Bars vs. Round Rods Anchored for Reinforced Concrete," appears in the December *Proceedings* of that society. The advantages and disadvantages of plain and deformed bars were discussed at length. Round rods were first used in reinforced structures in Europe, the speaker said, and are still used there almost exclusively, while the tendency in the United States is toward deformed bars. The speaker thought that most builders had been misled as to the value and effectiveness of deformed bars. The concrete takes the compressive stresses, while the steel takes the tensile stresses. There are also internal or secondary stresses, and the more deformed the bars the more uncertain the secondary stresses. While the deformed bars give greater resistance to slippage than round rods, there is also a greater longitudinal shear. This additional stress is the greatest objection to the use of the deformed bar. With green concrete these additional stresses are very dangerous.

The speaker explained the loop anchorage and other forms of end anchorage of rods. Answering the question why so many deformed bars are sold and why quite a few are commercial successes, he said that advertising often makes a success of an undesirable product; also that contractors are often willing to consider the cheapest as the best, no matter what the final results may be. "Round rods or other plain bars properly anchored will cost probably a little more than deformed bars when the cost of providing the anchorage is added to the nominal cost of the steel rods. Weight for weight, the round rods with the proper anchorage will win without any doubt, if the strength of the structure is taken into consideration. The only way to make as good a structure with deformed bars as with rods is to provide the deformed bars with an end anchorage. In that case there is evidently no use for deformation and the deformed bars will then cost more, weight for weight, for the same efficiency, since their cost is at least $2 to $3 more per ton."

The Quality of Steel for Reinforcement.

In the discussion on Mr. Toupet's paper, the question of the qualities of steel used in reinforced concrete work came up. On this the author said:

I think that what is known as a medium open hearth steel is preferable to others, as it is hard enough without being brittle. It is easily bent cold without cracking, which is a very decided advantage, since there are no structures built without bent rods. The high carbon steel is, I think, a dangerous material, as it is usually very brittle. Less steel is required and an economy of material is realized; but it is poor economy if we are to take any chances on the strength of the structure. Another big objection to its use when in shape of deformed bars is the greater shear around the periphery of the bar, since they are smaller or less in number than with mild steel. However, I think that comparatively little high carbon steel is used for reinforcement. I think it is well to use steel of 0.25 to 0.30 carbon steel only. Every foreman on a job can detect high carbon steel by bending, and will soon tell you that he has broken many rods that way. Some people allow 20,000 lb. per square inch on high carbon steel. I think this is too high, and that a medium open hearth steel is more reliable at 20,000 lb. per square inch than high carbon steel.

The Steel Manufacturer's Standpoint.

J. J. Shuman, inspecting engineer of the Jones & Laughlin Steel Company, discussed the subject as follows:

I think the author is somewhat misinformed when he says there is very little high carbon steel going into reinforced concrete. I am afraid there is a good deal of it going in, and I do not think it is very wise that this should be the case. He has brought out the idea very clearly, much to my gratification, that this business is in its infancy; that it is undergoing the process of selection and the fittest is going to survive, but so far certain styles of deformed bars and other reinforcing materials have apparently a long advantage over their competitors, simply through the force of advertising, as the author has said. Now this process of selection is going to continue, of course; nobody can prevent it. One of the strong influences in that process is going to be the question of cost.

I think it is on account of this very question of cost that so much steel is being used to-day, for the following reason: A form of deformed bar was discovered that is soft steel, and yet is of, perhaps, double the strength of soft steel. I refer to cold twisted squares. When the cold twisted squares appeared it became clear to those who were exploiting plain and deformed bars of ordinary elastic limit, say 35,000 lb. per square inch, that here was a foe which would require a great deal of attention. The only way that this competitor could be met on a common ground would be to raise the elastic limit of the product the manufacturer in question was making. The only way to raise that elastic limit was by raising the carbon. The carbon, therefore, was raised, and the bar made brittle in a conscienceless way, I think. This is one of the things that will have to disappear before the law of selection is done with its work.

I have seen a great deal of cold twisted steel manufactured. I am no more interested in it than in any other steel product, yet it does appear to me that this form of reinforcement has a number of features about it that are going to make the cold twisted square one of the survivors in this warfare of competition. The first element is cheapness of manufacture; the second is an elastic limit that cannot be approached by any other process. There are other very good reasons why the cold twisted bar should succeed, and one of them is the very reason that was named as one of the detriments by the author. I judge his allusion to torsional shears was aimed at twisted shears. Let me say that I have tested a great number of these bars and have found that the greatest strength is right at the surface. Therefore the cold twisted square opposes its very greatest strength to torsion. It has been claimed that a square will actually pull out like a screw and untwist when stress is put upon it longitudinally. I know this to be false, and for the very reason that I have named. A further good feature of the cold twisted square is the fact that the bar is known to be perfect; if it were not, it would not stand the twisting action. It has the mill scale removed from it in the process of manufacture, so that bond is never imperfect. It is a bar that can be bent at the end in hook form or any other form desired by engineers, because it is soft; it is soft steel, and yet it has the enormous elastic limit of at least 60,000 lb. per square inch; in the smaller sizes, perhaps 75,000 lb., or even higher; this for steel of the quality, before twisting, of ordinary medium structural steel.

The time has arrived for engineers to realize that high carbon means brittleness, and that they are taking chances when they write specifications which permit or require the application of high carbon steel bars in any form—plain, hot twisted or otherwise deformed. No specification is a safe one which calls for a value for minimum elastic limit as high as 45,000 lb. per square inch in any style of hot finished bar, because this elastic limit can be created in only one way—the addition of carbon.

Specifications should not attempt to provide for both cold twisted bars and hot finished bars in the same physical requirements. If plain bars or other hot rolled sections are favored, the physical requirements of the specifications and the unit stress in the design should be made to suit steel of safe carbons, say the standard structural grades, the elastic limit of which is about 35,000 lb. But if cold twisted bars are to be included, an appropriate specification would call for minimum elastic limit of 55,000 lb. per square inch, with cold bending test 180 degrees around a circle twice the size of the bar; and the quantity of steel to carry the required load may be reduced proportionately.

The Baltimore & Ohio Railroad Company has awarded contract to the George B. Swift Company, Security Building, Chicago, Ill., for improvements at Brunswick, Md., which will cost approximately $80,000, as follows: One standard 95-ft. engine house, 12 stalls; machine shop, blacksmith shop, smith, pipe and tin shop, carpenter shop and toolroom, 60 x 106 ft.; scrap bin, 20 x 40 ft.; two locomotive cleaning platforms, 76 ft. long; shopmen's and enginemen's toilet and locker room, 20 x 90 ft.; enginemen's work report room and roundhouse foreman's office, 20 x 35 ft.; steam heating system, sewers, drains, water, steam, air and blow-off lines. The larger buildings will be of brick and concrete construction.

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American Railroads Are Prosperous.

One of the striking facts of the severe depression which followed the panic of 1907 was the ability of American railroads to bear the strain of a heavy loss in traffic without defaulting on their fixed charges or their capital payments. Only a few roads of any importance went into receivership, one chiefly on account of internal difficulties and others because of flagrant overcapitalization. The great companies which have kept within the bounds of conservatism in their issues of securities were not only able to meet all payments but found it unnecessary to reduce their dividend rates, and when their traffic revived, after nearly two years of depression, their cash resources were practically unimpaired. There has been so much loose talk of an unfavorable character regarding American railroads and their securities that many people underestimate the financial strength of these great corporations. While short local lines built by over-enthusiastic local capitalists often come to grief, receiverships have been comparatively rare in the history of the large corporations which control the greater part of the mileage of the country, and even where companies have been reorganized through receiverships there have been few cases where investors have suffered loss if they retained their securities as legitimate investments without seeking to play fast and loose with the stock market. The Pennsylvania, New York Central and other great systems in the East have paid dividends from the very beginning of their operations. In the West, the large systems known as the grangers have paid dividends every year since the civil war. One moderately extensive line in that territory recently came to grief and was reorganized, but its difficulties grew out of overcapitalization which had grown to fantastic proportions. The transcontinental railroads have had their ups and downs, but in the past 10 years they have enjoyed remarkable prosperity and have paid handsome dividends. The Northern Pacific, Union Pacific and Santa Fe went through receiverships after the panic of '93, but the original holders of the securities on which these roads defaulted not only lost nothing but have made a handsome profit on their investments where they have retained their bonds and stocks.

The profits in railroad transportation which grow into dividends are derived chiefly from long haul carload freight traffic. The established railroad systems gain financial strength each year from the fact that there is a constant increase in the length of the average carload haul, keeping pace with the growth of the country. The most profitable railroads are those which control long haul industrial or carload traffic. This peculiar development of railroad traffic in the United States assures the financial future of practically all the large systems and enables them to build branches and extensions which provide additional facilities for the territory which they traverse.

In the 70's and 80's a large part of the annual addition to the country's mileage was contributed by companies which built short lines in the expectation that local traffic would sustain them. The panic of '93 practically brought an end to enterprises of this character, and the local railroads since that time have been built chiefly by lumbermen, mining interests or parties identified with the development of some particular industry. Such railroads when built have usually been recognized as common carriers, even when built through a forest or a wild country where the only traffic was contributed by the industry which built and owned the road, and in many cases they have been followed by settlers who have built up prosperous communities. The Interstate Commerce Commission has recently announced a doctrine that railroads of this character are not entitled to recognition as common carriers and are not to be allowed any share or proportional of through rates. This will strengthen the position of the large railroad systems, as it will give them practically a monopoly of the business of building branches and extensions to develop their territory.

Capital invested in railroads enjoys peculiar safeguards which the law does not provide for other enterprises. A line may be poorly located or burdened with extravagance in the cost of construction, but the law allows it to collect rates which will afford returns on its cost. Legislatures hold great power over affairs of property, but neither they nor the commissions they create can order reductions in rates which would deprive the owners of a railroad of interest on its cost. In hundreds of cases promoters of local railroads have failed to realize the profits they expected, but the instances have been rare where the cost of construction has been lost; at least, the losses of this character have been no greater than in manufacturing enterprises which have been poorly located or unfortunately managed.

Many people believe that American railroads are overcapitalized. It is a remarkable fact, bearing on this point, that the important railroads which have the largest capitalization per mile are those that have gone through receiverships and reorganizations under the supervision of the courts. Several large systems have gone through two or more receiverships and they have been the most conspicuous of all in the issue of securities not covered by actual cash invested. In each reorganization of these roads the courts have permitted a large increase in outstanding securities, and the most aggressive financiers in control of a going road have never been able to equal the rate of capital per mile which has been created by the judicial watering process. The only practicable plan that has been suggested thus far to regulate the capitalization of railroads is to provide by law that no securities shall be issued except for cash. This rule has been followed by many Eastern railroads since the beginning of their

organization, and during the past 10 years it has been generally followed by all dividend paying roads. Without any legislative restrictions the railroads have generally been more conservative than the courts.

American and British Competition for Canada's Tin Plate Trade.

Richard Thomas & Co., Ltd., Welsh manufacturers of tin plate, recently wrote the London *Daily Telegraph* on the condition of the British tin plate trade with Canada. Leaving out details, the statement amounts to this: American tin plate manufacturers, finding the home demand unequal to their output, secured concessions in wages which permitted them to ship tin plates into Canada in 1904, that market previously having been supplied entirely from Great Britain. The United States exported to Canada in 1906, 274,954 cwt. of tin plates and in 1907 205,915 cwt., the average for the two years amounting to 35 per cent. of Canada's total imports. The tin plate manufacturers of Great Britain furnished the remaining 65 per cent. After the panic of 1907 American manufacturers shipped into Canada in the five months of January to May, 1908, 214,665 cwt. of tin plates, or over 69 per cent. of the trade. The antidumping clause in the Canadian tariff came into operation in May, 1908, and in the next 11 months, ending April 30, 1909, Canada imported from the United States only 17,617 cwt. of tin plates, or less than 4 per cent. of the total, while the United Kingdom furnished 483,464 cwt., or 96 per cent. of the total. A large order for about 80,000 cwt. of tin plates for Canada is reported to have been placed in the United States at a price about 3 shillings per cwt. under the American domestic price and 6 pence per cwt. under the price of British tin plates laid down in Canada.

Richard Thomas & Co., Ltd., add that they are now informed that "in order to safeguard this trade for Wales we must erect a factory in Canada and transfer some of our employment to that country, although we can convert tin plates from the steel to the finished tin plate more cheaply in Wales than in any other country in the world." They lay stress on the announcement that the United States Steel Corporation will build a sheet and tin plate plant at Gary, Ind., costing $4,500,000, as indicating that a still greater tonnage will be crowded upon outside markets. So far as the official announcement indicates, the output of the Gary plant will be light plates and sheets, tin plate mills not being included in the programme thus far given out.

Based on the yearly imports of the past three years, it is stated, the Canadian tin plate trade amounts to 650,000 cwt. a year. This would mean for Welsh tin plate works £80,000 to £90,000 a year in wages, reckoned from the finished steel to the finished tin plate, representing permanent employment for about 1000 hands. The annual consumption of coal and steel in the tin plate works is put at 35,000 tons and 38,000 tons, respectively, for such an output as the Canadian tin plate trade represents.

It need not be expected that the Canadian government will consider the interests of Welsh tin plate manufacturers as paramount in determining its policy on the tin plate tariff. This tariff was imposed originally, and the antidumping clause became a part of it, because of the expectation that tin plate works would be established in Canada. A single plant was operated for a time, but after a chapter of vicissitudes the enterprise was given up, as has already been told in these columns. Now that there is no early probability of a Canadian tin plate industry, the interests of Canadian buyers of tin plates will no doubt be considered uppermost. British manufacturers are finding it hard to realize that Canada is more inclined to favor its own interests than those of the mother country. Proof has been given repeatedly that "Canada for Canadians" is the slogan of all the tariff legislation of our northern neighbor. Tin plate consumers there pointed out last year that the enforcement of the antidumping clause had been rather to transfer the Canadian tin plate trade from American to Welsh mills than to build up tin plate manufacture in Canada. While they did not object to some measure of protection to a home industry they were strongly opposed to protecting British tin plate manufacturers selling in Canada, against lower priced American tin plates. The government leaders in the British House of Commons were recently asked to approach the Canadian government with a view to having it restore the antidumping clause as applied to tin plate. There is nothing in the attitude of the Canadian government toward previous proposals in aid of British trade with Canada to give the slightest encouragement to effort in this new behalf. Moreover, the high cost of tin plate making in Canada is not likely to tempt Welsh manufacturers to adventure into that field and take their chances on the tariff schedules of changing administrations.

Railroad Equipment Orders.

The statistics of cars and locomotives ordered by the railroads in 1909, as distinguished from cars and locomotives built in that year, are of value as showing that in the second half the builders of railroad equipment accumulated a backlog for their operations in 1910. Taking freight cars alone, the figures of the *Railroad Age Gazette* show orders for 189,360 last year, of which 74,820 are all steel and 77,532 have steel under frames. This is three times as many as were ordered in 1908 and 25 per cent. more than in 1907. But it falls far short of the great records of 1906 and 1905, being only 60 per cent. of the number ordered in the former year and 55 per cent. of that in the latter year. Some basis for an estimate of what may be expected in 1910 is furnished by the record of equipment *ordered* and equipment *built* in the United States the past nine years. Locomotives and freight cars are embraced in the following table:

	Locomotives.		Freight cars.	
	Ordered.	Built.	Ordered.	Built.
1901	4,340	3,384	193,439	136,950
1902	4,665	4,070	195,248	162,599
1903	3,283	5,152	108,936	153,195
1904	2,538	3,441	136,561	60,806
1905	6,265	*5,491	341,315	*165,455
1906	5,642	*6,952	310,315	*240,503
1907	3,482	*7,362	151,711	*284,188
1908	1,182	*2,342	62,669	*76,555
1909	3,350	*2,887	189,360	*93,570

* Includes Canada.

Comparison of the past three years, which were all deficient in railroad buying (the falling off in new business being quite apparent some months before the panic of 1907) with the three preceding years shows

an interesting fact as to cars ordered. The average for the years 1907-1909, which was 134,580 freight cars, is only a trifle more than half that for the years 1904-1906. Moreover, with all the business placed with car companies in the second half of 1909 the year still falls short of either of the first two years of the decade, when the country was on a much smaller scale of railroad equipment needs than in this last year of the 10. What is well known is that financial considerations and those prompted by government attitude and action have controlled railroad buying since 1906 rather than the probable requirements of our transportation systems, looking only to the near future. It may fairly be expected, unless developments at Washington are untoward beyond anything now indicated, that the 1910 figures in all the above columns will show a pronounced increase over those for 1909.

A New Name for an Old Ailment.

The British workmen's compensation act has developed a new name for an old disease, ergophobia, which in simple words is "hatred of work." The ailment is by no means unknown in this and other countries, but in the British Isles it has been fostered by the compensation act, which compels the payment of damages to workmen for any injuries resulting in the course of their employment, regardless of the question of where the blame for the accident may lie. Certain decisions under the act have allowed compensation for disease following an accident, and the result has been inevitably to induce a class of work shirkers, with whom a stiffened joint, neuralgia or rheumatism suggests a claim and the chance of getting half wages from employers, and perhaps something from a friendly society, the name given to the mutual associations of workingmen. The physically feeble and the indolent find the opportunity attractive, and they are encouraged by unscrupulous practitioners of law or medicine.

CORRESPONDENCE.

The Sauntry Process for Treating Steel.

To the Editor: On February 20, 1907, we prepared a report on the Sauntry process for E. F. Colborn, William Sauntry and others. On June 26, 1907, E. F. Colborn told us that he had met with difficulty in bringing our rather long report to the attention of people who ought to read it, because they would not take the trouble to do so unless they first had a brief statement putting the matter in such a light that it would seem worth their while. He asked us to sign such a brief statement which he had drafted, assuring us that it was to be used solely as an introduction to our report, and we did so.

Since then we have been informed by Mr. Sauntry and others that he has been in the habit of showing our letter without showing or mentioning the report itself. We have repeatedly addressed him by registered post asking him to permit us to add a few words to our brief letter, mentioning the existence of our full report, in order that those to whom he showed the letter might know of the report, to which it was only to be used as an introduction. As the matter has now been running along for several months without our receiving any answers to our several letters, we feel compelled to inform the public that our letter to Mr. Sauntry is not our report upon the Sauntry process, and we ask you to publish this letter, of which we are sending a copy to Mr. Sauntry.

HENRY M. HOWE.
BRADLEY STOUGHTON.

NEW YORK, December 30, 1909.

The British Iron Trade Improving.

The new year opens with a better feeling in the British iron trade and a better outlook than that of a year ago. It is admitted that the expectations of improvement entertained early in 1909 were not realized until the latter part of the year, but the fact that pig iron prices were measurably maintained throughout the year and by its close were from 2s. to 4s. higher than at the close of 1908 is cited as distinct evidence of betterment. In the last week of December No. 3 Middlesbrough iron was selling at 51s. 3d., while one year previous it sold at 49s. 3d. Hematite iron, which has been unusually strong in the past month, showed an advance of 4s. in the year, West Coast hematite warrants being quoted at 61s. December 30, 1909, against 57s. December 31, 1908. The trade in hematite iron showed improvement in December and makers advanced their prices rather promptly. West Coast hematite sold at 60s. in October, November and early December, but buying in the past month has been good and furnaces have marked up their prices until 63s., and in some cases 64s., was paid for January delivery, while 65s. was asked for deliveries in February and March. Both ore and coke have advanced. Rubio ore was 17s. 6d., delivered at Middlesbrough, in early December; to-day it is 19s. 6d. Coke has been advancing meantime.

Stocks of pig iron in Connal's stores, Middlesbrough, increased about 25,000 tons in December. On December 29 the total was 387,422 tons, as against 136,214 tons at the close of 1908. Shipments from the Cleveland district were 84,932 tons in December up to the 29th, against 74,061 in the first 29 days of November and 68,328 in the same portion of December, 1908. Talk of pig iron exports to the United States has practically disappeared.

In the finished iron and steel trades the general expression is more hopeful. While 1909 did not bring the expected improvement indications are now more promising. Referring to the better outlook the London *Iron and Coal Trades Review* says that there is considerably more work in hand at the shipyards on the Clyde, Tyne, Wear and Tees than one year ago. The large expenditures for war vessels by European governments are a factor and all engaged in the shipbuilding industry are looking for a more prosperous year than they had either in 1908 or 1909. The number of vessels laid up for want of employment is not much more than half what it was at the end of 1908.

The course of prices in most finished lines was downward in 1909, though the decline was not great. Common iron bars were quoted at £6 2s. 6d. at the end of the year, against £6 5s. one year previous; steel rails, Middlesbrough, £5 7s. 6d., against £5 12s. 6d.; steel angles, Glasgow, £6 5s. (unchanged); ship plates, Glasgow, £6 2s. 6d., against £6 7s. 6d.; boiler plates, Glasgow, £6 17s. 6d., against £7 2s. 6d. Rail and plate manufacturers in the north of England are fairly busy. Merchant bars are more active and galvanized sheet mills are well employed. Sheffield steel manufacturers report a good demand for high speed steel from the United States and the Continent, but domestic business is still disappointing.

The National Electro-Platers' Association of the United States and Canada announce a dinner at Hotel Marlborough, New York City, on the evening of January 15. The following speakers and subjects are announced: Dr. Richard Moldenke, secretary American Foundrymen's Association, "Get Together"; Dr. W. A. Jones, chemist Celluloid Zapon Company, "Lacquers"; S. D. Benohiel, manager International Chemical Company, "Cleaning Compounds"; Percy S. Brown, chemist Western Electric Company, "The Future of Electroplating from an Electro-Chemist's View."

An Industrial Library.

A Special Library as a Business Factor.

That a thing so academic of title as a "library" should become a business instrument of high practical importance in a modern scientific industry is an interesting example of present day adaptation of means to ends. What the well-planned and competently used special library can accomplish is described in a paper lately read before the convention of the American Chemical Society by Guy E. Marion, who has charge of the special library and information bureau of the Arthur D. Little, Inc., Laboratory of Engineering Chemistry, in Boston. Though he describes a particular library, Mr. Marion presents in his paper, here greatly condensed, a clear idea of how a special library for any specific industry should be organized.

Why a Special Library Is Needed.

The chief cause leading to the development of the laboratory special library, as Mr. Marion points out, is the phenomenal growth of all business, which continually requires the introduction of new methods for expediting its procedure. Another contributing cause is the speed of present day business. No longer can the scientific expert wait until he has an opportunity to consult the public library or other outside source of information. This method is a vain reliance so far as the public library is concerned, for no public library has all the needed technical material, and its arrangement practically does away with the possibility of quick and certain reference.

As a noteworthy example of the successful and practical special library arranged to meet the requirements of a laboratory of industrial chemistry, Mr. Marion gives, as follows, an account of the Arthur D. Little special library, or information department:

Material is obtained chiefly through five channels: the purchase of special books or pamphlets to meet definite requests, through the mailing lists of outside concerns who send their advertising literature from time to time, through the kindness of individual acquaintances at various points who desire to exchange results, from chance notices appearing in the technical periodicals, which prompt us to initiate ourselves the getting of the information in question, and from the calls of clients and salesmen who may leave with us at their visits information of one kind or another. These are outside sources. The material produced within our own business, of course, comes to the library through the regular office routine.

All of the material then on its receipt falls into one of the following six groups: books, pamphlets, trade catalogues, special data, periodicals, and the museum collection.

How the Books Are Classified.

The books are classified by the Dewey decimal system, which long ago proved its claims in the public libraries. By its use, like books stand together on the shelves, and those related stand closely by. It permits of perfect intercalation of new material upon the shelves in proper order. Supplementing the Dewey subject number, each book has its Cutter's author number. The Kate E. Sanborn arrangement of C. A. Cutter's alphabetic order table is used for assigning these numbers. All books are entered in an accession book on their reception, thus keeping accurate data on each volume.

Pamphlets receive treatment similar to that of the books as far as their numbering goes, but in order to keep this material in a distinct class by itself, the small letter p is used before the classification number. The pamphlets are then placed in regular pamphlet boxes on the shelves.

Trade catalogues receive a somewhat different treatment, owing to their entire lack of uniformity. The best practical treatment has been found to be a shelf arrangement, in which all the small material is enclosed in envelopes, (9⅝ x 11¾ in., without flap, opening on the long side) and standing in one alphabet from a to z. To each company's catalogue is assigned a Cutter number; thus the catalogue of the Sturtevant Mill Company is S 936, which places it at one and the same time in a strictly alphabetical and numerical decimal order. This arrangement has the additional advantage of allowing those coming to the library seeking a particular concern's catalogue to go directly to the shelves without consulting an index.

Special data makes up a somewhat miscellaneous class of material composed of an accumulation of newspaper clippings, reviews of articles, results of personal interviews, special investigations, data culled from correspondence, and many other sources. The greater part of it is copied on correspondence size sheets, and placed in a vertical file. A small letter a preceding the number keeps this material distinctly in one class. The arrangement here is also by subject with the use of the decimal system.

The class of periodicals is made up of a selected list of about 50 scientific and technical publications, both foreign and domestic. For convenient reference all the periodicals are given symbols, such as E N for *Engineering News*, E R J for *Electric Railway Journal*. Thus, with the date of issue known, a certain reference can be easily and briefly made to any article. When the periodicals are bound, as many of the better ones are, they of course leave this class and become books. As for the others, after clipping, they are thrown away.

The museum collection is made up of a large assortment of samples obtained from various sources, clients, &c., for example, fibrous materials, mineral matter, special papers, artificial silks, standardized steels and irons, paper making chemicals, electric railroad materials, &c. To each individual sample is given a consecutive number, preceded by a small letter m, which serves to keep this material in one group by itself. The material is filed in glass cabinets, where it is on constant exhibition, and proves, at least to visitors, a source of lively interest.

In the actual handling of this material a color scheme is used. White tags are placed on the books, salmon on the pamphlets, blue on the catalogues, yellow on the special data, green on the periodicals, and cherry on the museum material. This is found to be helpful in the work, always aiding the eye in the rapid classification of material, and preventing often the return of material to the wrong place.

The Processes Followed.

Now as to the processes through which this bulk of material passes. Everything entering for permanent file is first accessioned, then catalogued and filed. The accessioning of the books has already been described; the other classes are accessioned on sheets kept for one week only, from which the information is later transferred to the weekly bulletin, which will be described below. This does not apply to the periodicals which are checked upon a special card system as they are received, nor to the museum articles, which are not accessioned.

The classifying takes place next, which is followed as soon as finished by the indexing. Author, title and subject cards are made out in nearly every case, and often several subject cards. The cards completed, the materials go to their respective files and the cards to the library index.

This index is one large dictionary catalogue from a to z, and now numbers between 30,000 and 40,000 cards. These are all standard 3 x 5-in. library cards, and the entire index is liberally supplied with guides for the searcher. After locating the proper material wanted in the index, the nature of the call number on the card will always indicate the group in which the

material itself will be found. This has already been explained in earlier paragraphs upon the different groups of material, by the use of the small letters s, p, m, &c., as symbols in the call numbers. A distinctive feature of filing cards with us is the placing of them first in their proper places, without the removal of the rods from the drawers. A second party then goes through the cabinet, verifying them and dropping them into their permanent arrangement.

The charging system carries out the color scheme. We have a small tray with the necessary compartments, in which narrow slips are used for keeping records of the material out of its regular place. White slips receive the book charges, salmon the pamphlet, blue the catalogue, and so on. On each slip are written the call number of the material, the initials of the borrower, and the date on which the loan is made. All material which is returned during the day is kept together in one place, and is returned to the files the first thing the following morning, the charge slips being removed at the same time from the charging tray.

The H. C. Frick Coke Company Restores 1907 Wages.

On Monday, January 10, the H. C. Frick Coke Company of Pittsburgh, posted notices at all its coke plants in the Connellsville region saying that on and after January 16, 1910, until further notice, the following wages and prices will be paid for labor by the company:

Mining and loading room and rib coal, per 100 bu	$1.35
Mining and loading heading coal, per 100 bu	1.50
Mining and loading wet heading coal, per 100 bu	1.62
Drawing coke, per 100 bu. charged	.78
(All the above by same measurement as at present.)	
Drivers and rope riders (shafts and slopes), per full run	2.60
Drivers and rope riders (drifts), per full run	2.55
Cagers, per full run	2.60
Tracklayers, blasters and timbermen (shafts and slopes), per day	2.60
Tracklayers, blasters and timbermen (drifts), per day	2.55
Assistant tracklayers and inside laborers, per day	2.00
Dumpers and tipplemen, per full run	2.00
Leveling, per oven	.12½
Chargers, per oven	.04½
Chargers per day	2.00
Forking cars, 40,000 lb. capacity and less	1.65
Forking cars, 50,000 and 60,000 lb. capacity	1.75
Forking cars, over 60,000 lb. capacity	1.90

The prices for all other labor, regularly employed in the operation of the plants, will be proportionate with the above.

Under this new scale the reduction made by the H. C. Frick Coke Company January 1, 1908, has been restored and the same scale of wages will now be in effect that prevailed for some time prior to January 1, 1908. This action of the company was entirely of its own initiative. For years the Frick Coke Company has paid wages on a sliding scale based on the average selling price of furnace coke on contracts. The average price on contracts for furnace coke for delivery through the first half of this year, and in some cases through all of the year, warranted this restoration of wages.

The Winona Technical Institute.

The city of Indianapolis is attempting to raise by subscription $200,000, through its Commercial Club, to purchase and keep under its control as a trade school the Winona Technical Institute. The institution has been renamed the "National Trade Schools and Technical Institute of Indianapolis." The city raised in the same way most of the $154,000 that bought the property from the Government seven years ago, after it was abandoned as an arsenal. There are 76 acres in the property, located near the center of the city. The whole tract is practically a park, with hundreds of stately forest trees. The Government spent $750,000 for the large brick buildings on it, these now being used for the different departments of the trade schools. The $200,000 the city will pay represents about the cost of the improvements made since the Technical Institute was established, such as heating and lighting plant, water system, &c. A board of Indianapolis business men has held the title in trust since 1903, when the property was purchased, but the deed has now been signed over to the institute trustees. This severs its relations with the Winona Assembly and Schools Association at Winona Lake, Ind., with which it has been affiliated and the directors of which had managed and controlled it. The property is valued at $1,000,000.

It was said at the meeting at which this movement was started that the Winona Institute is the only trade school in America that has brought national employing associations into active co-operation. Five or six of these have given to it over $100,000 in cash and equipment and have built up work shops of high order. It has the only school for iron molders and the only school of lithography in North America; it has one of the only two schools for tile setters and its school of pharmacy stands very high among those of that class. A school for machinists is being organized, much money having been already spent on it by the National Metal Trades Association. The National Founders' Association has been a liberal supporter. The National Hotel Stewards' Association has recently decided to build on the grounds a 500-room hotel, to cost $200,000. It will be a model and used as a training school for hotel employees. It will be a convenient home for the students. Special efforts are being made to increase the number of students at the school for molders, as the demand for the graduates far exceeds the supply. Orders for castings also far exceed the present possible output of the foundry.

Hickman, Williams & Co. Meeting.

The first meeting of the partners and salesmen of Hickman, Williams & Co. was held at Louisville, Ky., January 3 and 4, and it is the expectation that this will be an annual event. The initial meeting was arranged by the senior partner and organizer of the firm, Baylor Hickman, and was held at the Pendennis Club in Louisville. The dinner, at which 40 were present, 19 of whom were invited guests conspicuous in political or financial circles, was a noteworthy function. Mr. Hickman presided as toastmaster. It was announced that the annual gatherings would be held in succession in the different cities in which the company maintains offices. The next meeting will be arranged by Frank M. Eaton, the Cincinnati partner.

Among the guests at the Louisville gathering were the following: L. W. Botts, president, and Harry Weissinger, vice-president, Columbia Trust Company; Oscar Fenley, president Bank of Kentucky; Logan C. Murray, president American National Bank; Chas. F. Granger, president Granger & Co.; Geo. J. Long, vice-president United States Cast Iron Pipe & Foundry Company; Donald Macdonald, president Kentucky Heating Company; Sebastian Zorn, president Louisville Water Company; Graham Macfarlane, president Red River Furnace Company and Dover Iron Company. All the foregoing and the following were from Louisville: J. L. Helm, Chas. T. Ballard, S. A. Culbertson, Chas. H. Gibson, Dr. J. T. Wendell, Owen Tyler and A. J. Carroll. Other guests were: Geo. M. Clark, president Ohio Falls Iron Company, New Albany, Ind.; J. H. Lory, Cincinnati. Members of the firm and salesmen were as follows: Baylor Hickman, Louisville; H. L. Williams, Chicago; Frank M. Eaton, Cincinnati; John O. Henshaw, L. H. Miller, New York City; H. M. L. Hoffman, Philadelphia; T. A. Arthur, T. C. Ward, Pittsburgh; E. P. Hettiger, Richmond Nicholas, Day Williams, Chicago; B. P. Williams, R. S. Fox, St. Louis; R. B. Miller, H. Black, John Daker, Jr., John U. Byrd, Cincinnati; S. E. Frazee, Harry Pierce, Edward Ormsby, Louisville; T. L. Powell, Birmingham, Ala.

Trade Publications.

Graphite.—The Joseph Dixon Crucible Company, Jersey City, N. J., has just issued the eleventh edition of its interesting pamphlet entitled "Graphite as a Lubricant." This is practically a standard work and has been published for a number of years with revisions every two or three years. The pamphlet is divided into seven chapters, each of which deals with some phase of the theory and practice of graphite lubrication. In the first chapter the requirements of a lubricant and the advantages of flake graphite are touched upon. The results of tests made by Prof. W. F. M. Goss to determine the efficiency of graphite as a lubricant are given in the next chapter, while the third one relates a number of practical applications of Dixon graphite as a lubricant for bearings; stationary engines and pumps; marine, condensing and gas engines; air compressors; iron and steel and pulp and paper mills; and wire rope. A comparison of oil and grease as lubricants and general descriptions of the methods of feeding graphite, Dixon's graphite lubricants and the graphite industry complete the pamphlet.

Furnaces.—Rockwell Furnace Company, 26 Cortlandt street, New York. Bulletin G. Describes and illustrates a line of under-fired and over-fired furnaces using either oil or gas as fuel for annealing, hardening and tempering. The under-fired type is used for performing these operations in connection with the making of tools, dies, taps, punches, cutters, screws, springs, machine parts and sheet metal stampings and spinnings. The other model is employed for hardening, tempering, case hardening, annealing and carbonizing, where a uniform and controllable temperature is required for the heat treatment of nickel, chrome, vanadium, high speed and carbon steels, as well as brass, copper, silver and aluminum articles.

Machinery and Gray Iron Castings.—Gibson Iron Works, Gibson City, Ill. Catalogue. Covers a line of machinery and gray iron castings made in sizes ranging from 1 oz. to 3000 lb. Among the styles illustrated are flat and grated covers for cisterns, cesspools, manholes, coalholes, &c.; cast iron tamps; ashpit and cleanout doors and frames; small sewer gratings; grate bars; universal shoe lasts; ventilator gratings, and fire escape brackets and platform gratings.

Resistance Materials.—Driver-Harris Wire Company, Harrison, N. J. Catalogue G. Pertains to the line of resistance materials manufactured by this company, which includes Nichrome, Climax, Advance, Monel, nickel, Manganin, German silver and ferronickel resistance wire and ribbon. Each of the different metals or alloys is described and tables giving their properties, increased resistance due to rise in temperature above normal and carrying capacity are included. Tables of useful data, comparative resistances of different metals, decimals of an inch and differences between the various wire gauges complete the catalogue.

Steel.—Braeburn Steel Company, Braeburn, Pa. Three pamphlets. The first illustrates the different special sections made by this company, including taper bevels, double and single beaded bevels, plain single bevels and oval and diamond patterns of coal auger stock. Another deals with the Braeburn brands of tool steel and describes the different classes of tools for which each grade is best suited. A table of weights per lineal inch for square, round and octagon bars from 1-16 to 12 in. is included. The third pamphlet covers the Rocky Mountain and Star steel drill sections in sizes ranging from ⅞ to 2¾ in. and 1 to 2 in., respectively.

Thermit Repairs.—Goldschmidt Thermit Company, 90 West street, New York City. Pamphlet, 8 x 11 in.; 20 pages. Deals with the use of Thermit for making different kinds of repairs. Announcement is made that the British Corporation for the Survey and Registry of Shipping, Glasgow, has given its official sanction to marine repairs made by the Thermit process, and this is followed by a list of repairs to sternposts, rudder-frames and shafts that were successfully made with Thermit. An illustrated account of the repairing of a 48-ton flywheel in the wilds of North Carolina is given considerable space on account of the difficulties under which the work was done. The repairs made consisted of two welds in one spoke and another in the rim, as the result of an accident while the pulley was being transported to its destination. Some idea of the obstacles that were overcome can be gathered from the fact that the gasoline used had to be transported 50 miles and all the materials had to be taken to the grocery store and weighed there. Other repairs described are a sternpost weld for the United States Government, repairs to a cylinder of a high pressure hydraulic former, the welding of locomotive frames and the repairing of iron and steel rolls where the boss has been either broken off entirely or a small piece chipped out.

Gas and Gasoline Engines.—Charter Gas Engine Company, Sterling, Ill. Catalogue. Covers the Charter and Sterling gas engines and illustrates and describes special constructional features. There are a number of views of these engines in use for different purposes, and a list of 260 different lines of machinery that may be operated by a gas engine completes the catalogue.

Finishing Valve Bodies and Pipe Fittings.—Gisholt Machine Company, Madison, Wis. Circular. Illustrates and describes the use of the Gisholt lathe for finishing valve bodies and work of a similar nature, such as tees, crosses and ells. One of the advantages of this method, it is stated, is that once the piece is clamped between the upper and lower cradles it is not disturbed during the various operations upon it.

A vest pocket memorandum and daily reminder book with a calendar for the new year has been issued by the McKinney Mfg. Company, Pittsburgh, Pa. In addition to several well printed maps the book contains much useful information to business men.

Value of Mineral Products of the United States.

The United States Geological Survey has issued a large sheet giving a table showing the value of the mineral products of the United States by calendar years from 1899 to 1908 inclusive. These products are divided into two general groups, as metallic and non-metallic, and the products in each group are given with regard to the quantities produced each year and the values thereof. The grand total for the year 1908 was $1,595,670,186 as compared with $1,014,355,705 for 1899, an increase of approximately 57 per cent. Both metallic and non-metallic products contributed to the gain. The total value of metallic products was $1,045,497,070; of the nonmetallic products, $549,923,116; while the estimated value of such miscellaneous products as nitrate of soda, carbonate of soda, sulphate of soda, and alum clays used by paper manufacturers and arsenic, bismuth, cadmium, nickel, and cobalt, given as $250,000 and not reported in detail, brings the total up to the amount previously mentioned.

Some of the striking changes noticed in the ten years covered are an increase in the number of pounds of copper from 568,666,921 to 942,570,721; in platinum from 300 troy ounces valued at $1,800 to 750 valued at $14,250; in the value of coal of all kinds from $256,094,234 to $532,314,117; natural gas from $20,074,873 to $54,640,374; and tungsten from nothing to 671 net tons valued at $229,955.

Figures are also given for the total value of the mineral products for the 29 years from 1880 to 1908 inclusive which show an increase in the value of all classes of minerals of approximately 337 per cent.

Three men—the chief engineer, a keeper and a helper—were killed by an explosion of gas January 5 at Chocolay Furnace of the Lake Superior Iron & Chemical Company, at Chocolay, Mich. The furnace had just been blown in and the men had been at the top adjusting a valve. In returning they went by way of the machine shop and engine house instead of going down the outside stairway. As they entered the tank room on an upper floor with a lighted torch the explosion occurred, the room being filled with gas from the turning on of the blast. It is stated that the lighted torch was not necessary, as the electric lights were lighted. The position of the bodies indicated that death was caused by the explosion rather than by asphyxiation. The damage to the furnace was slight.

The Watson-Stillman Company, 50 Church street, New York, has made several additions to its sales department to handle the increasing business in hydraulic tools and turbine pumps. Edwin Stillman is assisting in taking care of customers in New York State, while all Southern railroad business is now in charge of Frank C. Clark. The more direct representation that has become necessary in the Orient will be in the hands of F. W. Horn, the well-known machinery importer of Yokohama, Japan.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, has received a large order for equipment for the coke oven plant to be erected by the Indiana Steel Company at Gary, Ind. The order includes 6 coke pushers, 8 coal leveling machines and 12 door lifting machines, all electrically operated.

Labor Notes.

The co-operative plan of school and shop training for boys has received an impetus at Chicago by the offer of La Verne W. Noyes. Paul Blatchford, secretary of the Chicago branch, National Metal Trades Association, refers to it as follows: "By his offer to furnish an unlimited number of scholarships for working boys at Lewis Institute Mr. Noyes has removed the last barrier to the success of the plan which the manufacturers of Chicago are gradually adopting. With the co-operation of progressive manufacturers it will now be possible for boys who are working in factories to alternate a week of industrial training at Lewis Institute with a week of practical shop work, their wages going on all the time. The $50 tuition fee for the work at the Lewis Institute will be borne by Mr. Noyes. Manufacturers who have in their employ bright, ambitious boys whom they would like to see progressing should consider whether they cannot afford to contribute every alternate week of the boy's time to his technical education."

At Uniontown, Pa., on January 10, announcement was made by O. W. Kennedy, president of the Independent Coke Producers' Association, that the independent plants in the Connellsville and Klondike regions will follow the example of the H. C. Frick Coke Company, and will restore coke workers' wages to the rates in effect prior to January 1, 1908. The same scale of wages for the different kinds of labor of coke workers will be paid by the independent producers as given in the Frick scale, printed elsewhere in this issue.

The Iron Molders' Union is now co-operating with the machinists' and patternmakers' unions in organizing the shops of Los Angeles, Cal. A campaign in the cities of the North Pacific Coast will follow, the aim being the establishment of an eight-hour day on the Pacific Coast.

Rogers, Brown & Co. Meeting.

On Friday and Saturday, January 7 and 8, D. B. Meacham, resident partner, entertained at his home, 3901 Reading road, Avondale, Cincinnati, the other members of the pig iron firm of Rogers, Brown & Co. It was the annual gathering, following a custom of several years, and all members were present save E. L. Billingslea, Chicago, who was on the ocean en route to Italy. Those who participated were: W. A. Rogers, Buffalo; M. C. Armour, Chicago; Arthur A. Fowler, New York; W. T. Shepard, Buffalo, and D. B. Meacham and J. K. Pollock, the Cincinnati partners. Mr. Meacham, in speaking of the meeting, voiced the sentiments of his associates in the statement that 1910 is expected to be a record breaker in the iron trade, from indications all over the country. It was also the opinion of those present at the meeting that the new year is ushered in under most auspicious circumstances. Rogers, Brown & Co. have under way a number of important furnace projects through connected companies. Most of these have already been mentioned in *The Iron Age* as they have developed and were naturally a subject of discussion at the conference.

Plans are under way for reorganizing the General Castings Company, Verona, near Pittsburgh, which has been in the hands of a receiver since 1907, and it is expected that the works will resume operations in the near future. E. A. Nesbit has been collecting all claims against the company at the rate of 75 per cent. of their value, and when he secures control, it is said that the company, under new management and with good financial backing, will resume business.

Further Results of Electric Smelting in Sweden.

A full synopsis of the report of Dr. Eugene Haanel, Canadian Director of Mines, on the results secured at Domnarfvet, Sweden, in the operation of the electric shaft furnace, has already been given in these columns (*The Iron Age*, September 16, 1909, p. 831). In the January issue of *Metallurgical and Chemical Engineering* is a translation in abstract of a very complete report on the Domnarfvet operations contributed by Lars Yngstrom to the *Jern-Kontorets Annaler*, No. 9, 1909. Some of the conclusions of the author are stated as follows:

By building furnaces of higher capacity, for instance of 2500 hp., and by paying particular attention to the factors which have a bearing on the heat losses, it is not impossible that a furnace can be built with an electric efficiency of about 80 per cent.—that is, one which surely could produce more than 3 metric tons of pig iron per horsepower year, provided a rather rich ore is used. It is difficult to estimate from the experiments which have been made what the maintenance cost of a furnace would be. The present furnace, however, has been in continuous operation for 85 days, and successfully met all requirements which indicate a durable furnace.

With electric furnaces it appears that the process of producing iron of different compositions is under more exact control than in other processes, since it consists mostly in regulation of voltage, which will produce corresponding changes in temperature. It has been possible to produce iron with less than 1 per cent. carbon, but in this case the slag content had a noticeable amount of iron. As a rule the carbon content varied between 2 and 3 per cent.

Judging from the tests made at Domnarfvet, it appears that the production of iron from iron ore in electric furnaces is successfully accomplished, both technically and economically speaking, but in order to obtain a more complete knowledge of the subject, these experiments should be continued on a larger scale. If electric operation is to be worth while, however, sufficient electrical energy at low price must be available. Summing up the advantages of the electric shaft furnace over the ordinary blast furnace, they are as follows:

1. Lower installation cost, since blowing engines and heating apparatus are not required.
2. Saving of about two-thirds of the fuel required in an ordinary blast furnace.
3. Ore dust can be used without briquetting.
4. The generated gases have a high heat value when free from nitrogen.
5. The possibility of producing in the furnace itself low carbon iron.
6. Less attendance, since the transportation and charging of two-thirds of the fuel used in ordinary shaft furnace is done away with.

Evidently it would be advantageous to combine electric shaft furnace for iron ore reduction with an electric steel furnace, which would refine the melted iron from the electric shaft furnace.

The Republic Power Plant at Haselton, Ohio.—The Westinghouse Machine Company, East Pittsburgh, Pa., has under construction an elaborate power installation designed to run on exhaust steam, for the new plant of the Republic Iron & Steel Company, now under construction at Haselton, Ohio. The installation will consist of two 900-hp. low pressure steam turbines with Leblanc condensers, which will utilize the exhaust steam from the mill engines at the plant. The steam will first pass through a steam regenerator and then to one turbine which will drive an alternating current generator in one section of the plant. In the mill proper, the direct current is used, so that a rotary converter will be necessary to use the power in the direct current generators.

The American Exposition at Berlin.—The machinery section of the American Exposition to be held in Berlin next June, July and August has been placed in charge of Burchard & Case, consulting engineers, 609 Cuyahoga Building, Cleveland, Ohio, who will respond to all inquiries regarding space and for other information. The machinery section will include machine tools, general machinery, power equipment, mining machinery and railroad tools and appliances.

PERSONAL.

Philip Schaefer, general manager of sales of the Follansbee Brothers Company, manufacturer of sheets and tin plate, Pittsburgh, has resigned to accept the position of assistant general manager of sales of the Jones & Laughlin Steel Company, Pittsburgh. He will have charge of the selling end in connection with the new tin plate plant now being built by that company at Aliquippa, Pa.

O. C. Gayley, second vice-president of the Pressed Steel Car Company, has been elected vice-president, succeeding the late J. W. Friend. C. W. Friend was elected a director to succeed his father.

David Van Alstyne, vice-president of the American Locomotive Company, in charge of manufacturing, resigned January 1. President Marshall announces that hereafter the head of this department will be James McNaughton, vice-president in charge of sales.

Wm. T. Nicholson, formerly connected with the Cutter & Wood Supply Company, Boston, Mass., will represent the J. W. Paxson Company, manufacturer of foundry supplies and equipment, Philadelphia, Pa., in New England territory. Headquarters will be established in Providence, R. I., where ultimately a branch warehouse will be established to facilitate deliveries to the local trade.

Michael H. March, formerly connected with Smith, Rudy & Co., analytical chemists, Philadelphia, Pa., has accepted the position of sales agent for pig iron and coke with Frank Samuel of that city.

David Van Alstyne, vice-president of the American Locomotive Company, in charge of manufacturing, resigned January 1, and this department will be in charge of James McNaughton, vice-president in charge of sales.

The friends of Sir Robert Hadfield, Sheffield, England, will learn with regret of his continued indisposition, which has led to the giving up of some of his responsibilities for a time.

F. F. Prentiss, owing to the condition of his health, has resigned as president of the Cleveland Twist Drill Company. He is succeeded by J. D. Cox, who has been vice-president of the company and who was the head of the original firm of Cox & Prentiss and first president of the incorporated company. Mr. Prentiss has started on a tour around the world.

H. B. Slate, formerly with the Fairbanks Company, New York, is now connected with the Brown & Zortman Machinery Company, Pittsburgh, as salesman, covering West Virginia and western Pennsylvania. George Cherrington, formerly with the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio., is also now connected with the Brown & Zortman Company, covering Pittsburgh and vicinity.

Donald Macleod, for some years connected with the Merchants' National Bank of Philadelphia, has resigned to become treasurer of the Jamison Coal & Coke Company, Frick Building Annex, Pittsburgh.

Walter McFarland, acting vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has resigned to engage in other business.

J. L. Haines has been appointed assistant to Willis L. King, vice-president of the Jones & Laughlin Steel Company, a position which has been created and become necessary owing to the large expansion of business of this concern. Alexander B. Shepherd, for 14 years superintendent of the Bureau of Water Supply of Pittsburgh, will resign February 1, to become general manager of transportation interests of the Jones & Laughlin Steel Company. He will have charge of the Monongahela Connecting Railroad, which it is probable may in time be extended to the Great Lakes. W. W. Willock, who has been president and general manager of the Monongahela Connecting Railroad, has resigned from that office to give his entire time to his other duties connected with this company. Frank McCune, who was general superintendent of the railroad, has been made general manager. All these changes become effective February 1.

J. W. Searles has been appointed assistant general sales agent of the Pennsylvania Coal & Coke Company with headquarters at 17 Battery place, New York.

E. W. Puckett, Fort Wayne, Ind., after 20 years spent in the machinery and mill supply business, has made a change and become connected with the Trademark Title Company, Fort Wayne, a corporation organized for the purpose of designing, registering and protecting trademarks.

Paul Stoner has joined the selling force of the American Emery Wheel Works, Providence, R. I. He was connected with the Landis Tool Company, Waynesboro, Pa., for several years and more recently with the Allis-Chalmers Company and Cleveland Automatic Machinery Company.

John N. Allen, purchasing agent of the Lackawanna Steel Company, Buffalo, N. Y., has been appointed general manager of the Davidson Foundry Company, Chicago.

J. W. Deetrick, general superintendent of blast furnaces and of the Bessemer and Brown-Bonnell plants of the Republic Iron & Steel Company at Youngstown, Ohio, has also been made general manager of the new open hearth plant now being erected by the company at Haselton. John Baxter has been made superintendent of the new tube mills and Thomas J. Maloney assistant superintendent.

J. W. Coyle, who was connected with the Best American Calorific Company until that company retired from business, is now with the Rockwell Furnace Company, 26 Cortlandt street, New York, making a specialty of oil and gas furnaces for railroad work. He is an experienced railroad man, having formerly been master blacksmith for the Lehigh Valley Railroad at Wilkes-Barre, and later in charge of the drop hammer and machine department at the forge shops of the Reading at Reading, Pa.

The Philadelphia Foundry Foremen.—One of the most enthusiastic meetings ever held by the Associated Foundry Foremen of Philadelphia and Vicinity occurred on the evening of January 11 at the association's headquarters in the Odd Fellows' Temple, Philadelphia, Pa. W. P. Cunningham occupied the chair, and after routine business had been transacted the following officers were elected to serve for the ensuing year: President, Clarence R. Brown, E. E. Brown & Co.; vice-president, W. P. Cunningham, Pencoyd Iron Works; treasurer, George M. Benkert, Fairmount Foundry Company; secretary, D. M. Kittenger, Pencoyd Iron Works; official chemist, George C. Davis. James Whitehead, Abram Cox Stove Company, was elected an active member, and A. A. Miller, *The Iron Age*, as an associate member of the association. Following the transaction of business, the new president took the chair and outlined a policy of increased activity for the association. Considerable attention will be given to the selection of subjects for discussion at the various meetings, and every effort made to promote the welfare of the members. Thomas Devlin, president, and Howard Evans, secretary, of the Philadelphia Foundrymen's Association, made brief addresses, and did also George C. Davis and A. A. Miller, on the benefit of association work and the good to be derived from the exchange of views and full and frank discussion of subjects of interest to the foundry foremen. The association enters the year with every promise of the most successful period of its existence.

OBITUARY.

STEPHEN W. BALDWIN.

Stephen Warner Baldwin, who was for many years sales agent in New York for the Pennsylvania Steel Company, died at Brookline, Mass., January 5, aged 76 years. He was born at Baldwinsville, N. Y., a town named for his grandfather. In the early part of his business career he lived in Lawrence, Mass., where he rapidly became influential, and later removed to New York. He took a prominent place in engineering circles, being a manager of the American Society of Mechanical Engineers in 1887-90 and a vice-president in 1890-92. He was one of three honorary members of the Engineers' Club of New York. Mr. Baldwin married Helen B. Turnure, of New York, who died some years ago. He leaves two children—Bessie Baldwin Endicott, of Brookline, Mass., and Abram Turnure Baldwin, of Detroit, Mich. One sister, Mrs. David M. Turnure, of New York City, also survives him.

Mr. Baldwin's longtime friend, M. P. Higgins, president of the Norton Emery Wheel Company, Worcester, Mass., writes of him: "He became an ardent advocate of the new education known as industrial education. Although his skill as an engineer and

STEPHEN W. BALDWIN.

an executive officer in a large corporation was beyond question, he was equally sought as a friend, a citizen and a member of society. Tall and commanding in figure, he possessed the grace, refinement and broad knowledge of the scholar and the gentleman. His views on education were very clear, practical and unique. He was a great advocate of the high value of trade training and high-grade mechanical skill as an effective means of true education, including mental discipline and culture. The Artisan School at Syracuse and the Half Time Trade School at Worcester have both received much of his best attention. His pleasing personality, his impression of good fellowship by which he put everyone at ease inspired such confidence in his integrity that he was constantly sought as an adviser. He was a man of great power of application, a sound thinker and an analytical reasoner. All his life he was a diligent and painstaking worker and all he acquired he fully and generously shared with others."

WILLIAM C. POST, vice-president of the well-known structural steel firm of Post & McCord, New York, died at Atlantic City, N. J., January 5, aged 43. He was a graduate of Stevens Institute and was president of its Alumni Association. In the early part of his engineering career he was associated with his father and with William H. McCord. Their business was merged in the American Bridge Company on its formation in 1900. Mr. Post was made chief draftsman and held that position until 1903, when the firm of Post & McCord was formed.

The Crucible Steel Company of America's Improvements.

Some time ago the Board of Directors of the Crucible Steel Company of America, Pittsburgh, decided to improve its plants up to the latest standard for economical working.

At the Atha Works, Harrison, N. J., where a large amount of Government work is made, the company is erecting a modern power plant to be equipped with mechanical stokers, steam economizers and mechanical devices to handle coal and ashes automatically, cutting down the labor costs to a minimum. It is also proposed to install a number of large gun lathes to take care of the larger caliber of guns required by the Government. Additional hammers and presses are to be supplied to handle more rapidly an increased output of projectiles for naval use.

At the Park Works, Pittsburgh, contracts have been made for a system of crane runways with electric cranes on the ground between Thirty-first and Thirty-second streets on the Allegheny Valley Railroad, for the economical handling and storage of billets and raw material.

At the LaBelle Works, Allegheny, the company is completing a large addition which it expects to have in operation the present month, the improvement covering a new 20-in. mill, with engine, furnaces and all economical handling mechanism complete, in addition to a new steam plant to control it. These improvements will considerably increase the production of implement steel at this works and at the same time reduce cost of manufacture.

At the spring plant at McKees Rocks, Pa., which is turning out over 1500 tons of railroad springs per month, the company is completing a modern steam plant equipped with mechanical stokers, which will largely increase the output of springs and at reduced cost.

The Crucible Steel Company management intends to put all its plants in the strongest position to meet conditions which must come with bad times, and through the installation of new and labor saving machinery it expects to be able to reduce costs so as to meet the most severe competition and at the same time keep up its high quality of material.

The Jones & Laughlin Steel Company, Pittsburgh, has placed an order with the Allis-Chalmers Company for an additional blowing engine, with cylinders 46 and 86 x 84 in. and 84 x 60 in., to be added to a row of 10 already installed at its new plant at Aliquippa, Pa.

The Pittsburgh Machine Tool Company, Northside, Pittsburgh, is operating its plant to full capacity. Recent shipments were as follows: Hyde Park Foundry & Machine Company, Hyde Park, Pa., 48 in. by 25 ft. lathe; Continental Rubber Company, Erie, Pa., 48 in. by 10 ft. lathe; Williams Foundry & Machine Company, Akron, Ohio, two 42 in. by 9 ft. lathes; Goodyear Tire & Rubber Company, Akron, Ohio, 48 in. by 16 ft. lathe; Farrell Foundry & Machine Company, Ansonia, Conn., 60 in. by 30 ft. lathe, motor driven.

NEWS OF THE WORKS.

Iron and Steel.

No. 1 Furnace of the Republic Iron & Steel Company's plant at Thomas, Ala., will be blown out for relining January 15.

The furnace of the Southern Iron & Steel Company at Alabama City, Ala., has been blown in on basic iron.

The rolling mill of the former Emery Steel Company at Birmingham, Ala., is now being operated by R. C. Foster & Co.

General Machinery.

W. E. Leard, New Brighton, Pa., manufacturer of connecting rods for gas and steam engines, proposes to build a brass foundry as well as the forge, machine and pattern shops now in course of construction. These improvements will considerably increase his capacity, and he will install some new machinery, such as drop hammers, milling machines, &c. The new building to contain these departments will be 86 x 185 ft.

The Grand Forks (N. D.) Foundry & Machine Company finds an increase in its manufacturing facilities necessary. Some new equipment will be purchased shortly.

Plans have been prepared for an addition to the works of the Canton Drop Forging & Mfg. Company, and new equipment is being arranged for.

The National Machine & Foundry Company, Connellsville, Pa., will build an addition to its plant.

The Sebastian Lathe Company, Covington, Ky., has had plans drawn for an addition to its plant. This will be used primarily for assembling and storage, but it is likely to be converted into a machine shop before the end of the present year.

The recent fire at the plant of the Titusville Forge Company, Titusville, Pa., manufacturer of iron and steel forgings, was not as serious as reported. The company will have a number of hammers running within a few days, and is so situated that it can take care of its trade very nicely, and there will be no delay whatever in filling orders. The loss was fully covered by insurance.

The Scott-Madden Iron Works, St. Louis, Mo., has increased its capital stock from $75,000 to $150,000, and has taken over the plant of Madden & Co., Rushville, Ind. With the acquisition of the Rushville plant the company now has two foundries and two machine shops, the other one being located at Keokuk, Iowa. With the consolidation of the business the company is now able to furnish all kinds of clay working machinery as well as being able to furnish heavy castings and do special machinery building. The company is not contemplating any improvements at present, but is installing a few machine tools, most of which have been purchased.

The Otis Elevator Company, Pittsburgh, has received a contract for the installation of two electric elevators in the Goff Building, Clarksburg, W. Va.

Foundries.

The Waterloo Malleable Iron Works, Waterloo, Iowa, will have its plant ready for operation about March 1. The main foundry building will be 75 x 300 ft. and will have a capacity of 30 tons of gray iron and 15 tons of malleable per day, besides which there will be an annealing and cleaning room 40 x 140 ft.; core and cleaning room for gray iron, 50 x 90 ft., and a machine shop, 50 x 120 ft. The machine shop equipment will consist of automatics and semiautomatic turret machines adapted for transmission work, of which the company will make a specialty.

Owing to the volume of business offered this winter, the Champion Iron Company, Bellefontaine, Ohio, will be compelled in the near future to enlarge its plant. Some large season contracts have recently been taken for castings.

The plant of the Canadian Iron & Foundry Company, Montreal, Canada, which was recently damaged by fire, will be rebuilt and considerably extended, with consequent modernizing of equipment.

Some new tools for foundry work and machining are required by the Muskogee Foundry Company, Muskogee, Okla., which will add to the capacity of its plant.

The Darbyshire-Harvey Foundry Company, El Paso, Texas, whose extensions were recently reported, is preparing to install a line of new machine and boiler shop tools. The business of this concern is very active, particularly in providing for the repair work of the large smelters to the West.

The Northern Pacific Railroad Company, St. Paul, Minn., is having plans prepared for a new foundry to be erected at Brainerd, Minn. Plans are not yet prepared and no definite information can be obtained, although it is the intention of the company to erect a structure which will be up to date in every particular. W. C. Smith, engineer maintenance of way. It is estimated that the foundry will cost about $125,000.

Power Plant Equipment.

The McKinney Mfg. Company, North Side, Pittsburgh, manufacturer of hinges, butts and iron specialties, closed a contract last week with the Allegheny County Light Company for central station power, covering a long term of years. The company will use about 560 hp. and will abandon its own power plant, replacing it with a synchronous motor generator set. The company makes the change on account of the elasticity of the central station power, in accommodating itself to varying loads. The contract for the electrical machinery was placed with the General Electric Company.

The Reliance Boiler Works, Milwaukee, Wis., is erecting an addition which will approximately double the capacity of its plant, at a cost of about $20,000.

The boiler shop of J. T. Cullen, Clinton, Iowa, operated as the Star Boiler Works, recently burned. It will probably be rebuilt on a larger scale, although other arrangements may be made.

The Smithfield Milling Company, Smithfield, Ohio, is asking bids for the installation of a 75-hp. steam engine.

Bridges and Buildings.

The August Feine Wrought Iron Works, Buffalo, has purchased a site, 140 x 600 ft., on Scranton street, the Delaware, Lackawanna & Western Railroad and the South Buffalo Railroad, near the Lackawanna Steel Company and the new Lackawanna Bridge Company works, upon which the company purposes to erect during the year a plant for the fabrication of structural steel. Meanwhile the site will be used as a storage yard for structural material.

The Kenwood Bridge Company will install a large traveling crane and other equipment in its foundry extension at East St. Louis, Mo. It is understood that purchase of the crane will be made through the American Steel Company, Chicago, from whom the plant is leased.

The Champion Bridge Works, Wilmington, Ohio, will probably unite with other industrial plants of the city in taking electric current for operating its shops from a central power company to be organized for building and equipping a station. The arrangement proposed is similar to that of the automobile manufacturers at Flint, Mich.

Fires.

The north plant of the New England Brick Company, near Mechanicville, N. Y., was destroyed by fire January 3, the loss being about $40,000.

The plant of the J. D. Connell Iron Works Company, New Orleans, La., was wrecked by fire Jan. 6; loss, $50,000.

The Valley Works of the Republic Iron & Steel Company at Youngstown, Ohio, were damaged $20,000 by fire January 7.

The plant of the Muncie Glass Company, Muncie, Ind., was burned January 6, with $65,000 loss. It was owned by Charles Boldt of Cincinnati.

Hardware.

The Seneca Chain Company, manufacturer of welded chains, machine and hand made, whose plant at Kent, Ohio, was recently destroyed by fire, advises us that it will rebuild its works at Kent, and when its present plans have been put in execution the concern will have a much more modern and attractive plant than it had before the fire.

Miscellaneous.

The Wilcox Engineering Company, Saginaw, Mich., will soon move into its new quarters, which are now practically completed. The new factory is 62 x 180 ft., and will be equipped with modern machinery, and the company will double its capacity and number of employees.

The Conneaut Shovel Company, Conneaut, Ohio, whose plant was recently destroyed by fire, has not decided whether it will rebuild, but advises it is its desire to do so if the necessary money can be raised.

The Piper Machine Company, Indianapolis, Ind., has been incorporated with a paid up capital of $10,000. The concern has been doing business under the name of the J. C. Piper Machine & Auto Company, the object of incorporating being to take in more capital, which would enable it to do a larger volume of business. The company's plant is fully equipped for machining or making any parts that automobile builders may require.

The Jonz Auto Company, Beatrice, Neb., which was recently consolidated with the Beatrice Lawn Mower Company and capitalized at $150,000, of which $108,000 has been paid in, will start operations within a few days.

The Sterling Wheelbarrow Company, Milwaukee, Wis., is erecting a plant for the manufacture of iron wheelbarrows which will consist of three buildings and will give employment to about 300 men.

The Pioneer Metal Mfg. Company, South Bend, Ind., has been incorporated with $50,000 capital stock to manufacture a folding steel stepladder. Space has been obtained in the old Singer plant, which has been equipped with special machines.

N. C. Davison & Co., engine and machinery agents, Keenan Building, Pittsburgh, have recently received contracts as follows: Duquesne Cigar Company, Pittsburgh, a 27-hp. Jacobson auto-

matic gas engine; Apple Brothers, Etna, Pa., a 4-hp. Jacobson gas engine; Kewanee Water Company, Pittsburgh, a 20-hp. gas engine; Federal Engineering Company, Pittsburgh, two 20-hp. gas engines; J. T. Keenan, Pittsburgh, 10-ton Baker ice machine and compressor; Kittanning Fire Brick Company, Kittanning, Pa., 160-hp. gas engine.

A branch office has been opened in the First National Bank Building, Houston, Texas, by the U. S. Flexible Metallic Tubing Company of Los Angeles, Cal.

R. B. McConney, who has been manager of Allis-Chalmers Company for the Denver District, recently acquired an interest in the F. M. Davis Iron Works of that place, as reorganized, and will act as general manager.

The Adolph Leitelt Iron Works, Grand Rapids, Mich., will be a large addition to their present plant, with corresponding increase in the equipment and volume of output.

The Monitor Drill Company, Moline, Ill., has determined upon an extension of its foundry. Pneumatic tools and possibly molding machines will be among the requirements of the new part.

The Briggs Mfg. Company, Detroit, Mich., has completed plans for a three to four story factory, 86 x 363 ft., which will be equipped with special machinery, power, apparatus, boilers for heating, sprinkler system, &c.

The Rockford Punch & Mfg. Company, recently incorporated, will establish a plant in Rockford, Ill., for the manufacture of shop tools. Plans have not yet, however, been fully matured.

A. C. Downing, Indianapolis, Ind., is having plans prepared for building a new factory to be occupied by the Direct Drive Company, recently organized. Cut gears will be among the products of the plant. Shop machinery is not to be ordered for some weeks yet.

The A. P. Wagner Tool Works, Detroit, Mich., which was sold to the Russell Wheel & Foundry Company, will be fitted up for the production of motor vehicle parts and similar specialties.

The Seamless Pressed Steel Mfg. Company, recently mentioned, has definitely decided to remove its plant from Dayton, Ohio, to Redkey, Ind. Some new equipment, including power and pressure machinery, will be required.

The Northwestern Steel Radiator Company, Sauk Center, Minn., is preparing for a largely increased production, and its manufacturing facilities will be extended.

The La Grande Mfg. Company, recently organized at La Grande, Ore., will establish a plant for the production of agricultural machinery, including a new patented thresher.

The Sapulpa Steel & Iron Mills, Sapulpa, Okla., is preparing to install a heavy duty engine, with 28-in. cylinder and 48-in. stroke, in the power plant that is being erected.

The Summer Iron Works, Everett, Wash., contemplates establishing a branch plant at Vancouver, B. C.

It is reported from Anderson, Ind., that a new manufacturing plant will be erected there by the Anderson Tool Company.

The Niagara Machine & Tool Works, Buffalo, N. Y., has completed plans for the first building of its new plant, to be located at Northland avenue and the New York Central Belt Line. This will be a machine shop, 200 x 200 ft., one story, brick and structural steel, with concrete floor and roof. Work will be started early in the spring.

The Carbondale Machine Company, Simpson, Pa., has in course of construction an addition to its plant, 35 x 100 ft. This building will be used as a blacksmith and test shop.

The McCall Mfg. Company, Macon, Mo., manufacturer of special farm implements, has completed its foundry and machine shop. It is the intention of the company to add considerable machinery in the next few months.

The Superior Motor Vehicle Company has been incorporated at Buffalo, N. Y., to manufacture automobile trucks and commercial motor vehicles. Arrangements have been made by the new company to build a manufacturing plant at Elmwood avenue and the New York Central Railroad. J. Willard Lansing, 150 Michigan street, will be president of the company, and Fredk. Hummel, 293 Oak street, secretary.

The Northern Engineering Works, Detroit, Mich., builder of the Northern cranes, has purchased additional land adjoining its plant and will probably make extensions this season.

The Fawcus Machine Company Acquires a Foundry.—The Fawcus Machine Company, with office and plant at Twenty-eighth and Smallman streets, Pittsburgh, has purchased the property formerly belonging to the Fischer Foundry & Machine Company, at Ford City, Pa., on the Allegheny Valley branch of the Pennsylvania Railroad, consisting of several buildings equipped with cupola and converter for the manufacture of gray iron and steel castings, a full line of machine tools, cranes, &c. Officials of the Fawcus Machine Company are now in Ford City arranging matters so that the plant will be ready for operation about February 1. This company manufactures cut gears, operating machinery for bascule bridges, special equipment for rolling mills, &c., and the new plant will not only provide castings, as it requires, but machine facilities, enabling it to handle larger and heavier work than heretofore. The general offices will continue in Pittsburgh.

Increasing Ore Unloading Facilities at Lake Erie Ports.

The equipment for handling iron ore at Lake Erie ports will be materially increased the coming season by installations for which contracts have just been let and others that are under negotiation. In the past week the Cincinnati, Hamilton & Dayton has placed contracts for the building of an entirely new ore handling plant in Toledo, which will consist of two 15-ton Hulett ore unloaders and a 10-ton ore bridge, contracts for which have been placed with the Wellman-Seaver-Morgan Company, Cleveland. The Pittsburgh & Conneaut Dock Company, a subsidiary of the United States Steel Corporation, has also placed a contract with the Wellman-Seaver-Morgan Company for one 15-ton Hulett unloader, which will be installed as an addition to the company's present ore handling plant at Conneaut, Ohio. The Lake Shore Railroad recently placed an order for four 15-ton Hulett unloaders, which will be installed at Ashtabula. The Pittsburgh & Conneaut Dock Company erected four 15-ton Hulett unloaders at Ashtabula last year. The plants for which contracts have just been closed will probably not be ready for operation until near the end of the season.

The Erie Engine Works Expanding.—The Erie Engine Works, Erie, Pa., which for some time has been considering the enlargement of its manufacturing facilities, has decided to go ahead with the actual work and is this week taking bids on the structural steel required for the new buildings. The plans prepared by F. Felkel, engineer, 413 Fourth avenue, Pittsburgh, call for a foundry building 130 x 440 ft., of saw-tooth construction, with cement tile roof, to contain two 66-in. cupolas, two 30-ton electric traveling cranes, &c.; a boiler and engine room, about 40 x 80 ft., of steel construction; an office building, 40 x 40 ft., two stories; storeroom and men's rest room; pattern storage building, 55 x 104 ft., of reinforced concrete construction, with fireproof windows, elevators, &c.; a carpenter shop, 40 x 50 ft.; a yard traveling crane having 40 ft. span and 200 ft. runway, and other necessary equipment. All of the above is to be erected on a 10-acre plot of ground on the west side of Erie, Pa. Bids should be mailed to the Erie Engine Works, at Erie, Pa. The company being crowded for space and no ground being available where its present plant is now located was forced to seek a new location elsewhere. It manufactures a high speed engine for electric light service, &c., on which it is doing considerable business.

The Longmead Iron Company, Lewis N. Lukens, president, Conshohocken, Pa., makes the following announcement: Effective January 1, John M. Reeves, formerly of the Cumberland Nail & Iron Company, assumed the position of sales manager, in place of P. N. Guthrie, Jr., who will hereafter be the company's representative in New York City and the Metropolitan District, with offices at 30 Church street, New York City. John B. Guthrie will continue in Pittsburgh and adjacent territory, with offices at Columbia Bank Building, Pittsburgh. T. H. Speddy & Co. will continue as representatives on the Pacific Coast, with offices in the Balboa Building, San Francisco. The representation in Savannah, Ga., is discontinued for the present.

The Iron and Metal Trades

Little Demand for Finished Steel.

Buying of Pig Iron for Pipe and Malleable Foundries.

January is not yet far enough advanced to show definite tendencies in the iron market. After the remarkably heavy specifications sent to the steel mills in December an inactive period is to be expected in finished lines, and generally new business has been light. Jobbers who specified to the last ton before January 1, on material bought at $4 to $6 below current prices, are now carrying large stocks and will not be liberal buyers for some time. A factor difficult to measure is the extent to which the restocking of the country in iron and steel figured in the enormous demand in the second half of 1909, which brought the industry up to a 32,000,000-ton rate of pig iron production.

The railroads are placing few orders, and in rails the situation is distinctly disappointing, particularly to Eastern mills. The heavy advance buying by Western lines which has filled up mills in that section for the greater part of the year is in sharp contrast with the procedure of the Eastern roads. With one exception the six mills east of Ohio have few orders ahead. One of these mills is now rolling billets and more may be heard of Eastern billets in Central Western markets.

In railroad equipment orders also the West and Central West have made a much better showing relatively than the East. Good buying of locomotives for Western lines is in prospect at Chicago. Car orders pending include 3250 for the Norfolk & Western and 1500 for the Chesapeake & Ohio.

The principal structural steel contract of the week is for 5000 tons for the new Davenport Locomotive Works, Davenport, Iowa.

Buying of wire products has kept up, sales this month being at the rate of 4000 to 6000 tons a day.

In view of the large stocks in second hands not much is expected this month from the merchant pipe trade with mills. The one large inquiry in the market is from the Arkansas Natural Gas Company, which is still figuring on 200 miles of 10-in. and 12-in. pipe.

In pig iron markets the moderate activity of the first week of the year has continued and inquiry has broadened, in some cases covering the second half of the year. Negotiations for malleable Bessemer iron represent good sized amounts in the Chicago, Central Western and Eastern markets, and considerable malleable business has been closed. The Buffalo market in foundry and malleable irons has been active, and following free selling to New England consumers below recent quotations prices are reported to be more firmly held.

An Ohio pipe interest has bought 20,000 to 25,000 tons of Nos. 3 and 4 irons, divided between Northern and Southern furnaces, at about 25c. below current prices, for first half delivery. Some of this buying was for the second half. Southern No. 2 iron is offered at $14, Birmingham, for the first half of the year, various advances from this figure being named for the second half Stocks at Alabama and Tennessee furnaces are estimated at 150,000 to 175,000 tons, including warrant iron.

There is little movement in steel making irons. In the Central West basic iron is still sold at $17.

Sales of spot coke have been made at $2.50, at oven, with contract coke at $2.60. The Steel Corporation is not a buyer of coke, its production being practically equal to its needs, but is still receiving deliveries on an old contract as insurance against winter contingencies. Additional security is afforded by its stock of 500,000 tons.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Jan. 12, 1910.	Jan. 5, 1910.	Dec. 8, 1909.	Jan. 13, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$19.00	$19.00	$19.00	$17.25
Foundry No. 2, Southern, Cincinnati	*17.25*	17.25	17.75	16.25
Foundry No. 2, local, Chicago	19.00	19.00	19.00	17.35
Basic, delivered, eastern Penn.	18.75	18.75	18.75	16.75
Basic, Valley furnace	17.00	17.00	17.00	15.50
Bessemer, Pittsburgh	19.90	19.90	19.90	17.40
Gray forge, Pittsburgh	17.40	17.40	17.40	15.40
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	27.50	27.50	27.50	25.00
Forging billets, Pittsburgh	*31.00*	31.00	32.00	27.00
Open hearth billets, Philadelphia	30.60	30.60	30.60	26.20
Wire rods, Pittsburgh	33.00	33.00	33.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28,00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	17.25	17.25	17.25	14.50
Steel rails, melting, Philadelphia	*17.00*	17.00	17.50	17.00
Iron rails, Chicago	20.00	20.00	20.00	18.75
Iron rails, Philadelphia	20.50	20.50	20.50	21.25
Car wheels, Chicago	18.50	18.50	18.50	16.00
Car wheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, Pittsburgh	*17.75*	18.00	18.00	16.75
Heavy steel scrap, Chicago	16.00	16.00	16.00	14.00
Heavy steel scrap, Philadelphia	*17.00*	17.00	17.50	17.00
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	1.65	1.65	1.65	1.55
Common iron bars, Chicago	1.60	1.60	1.60	1.50
Common iron bars, Pittsburgh	1.70	1.70	1.70	1.50
Steel bars, tidewater, New York	1.66	1.66	1.66	1.56
Steel bars, Pittsburgh	1.50	1.50	1.50	1.40
Tank plates, tidewater, New York	1.71	1.71	1.71	1.76
Tank plates, Pittsburgh	1.55	1.55	1.55	1.60
Beams, tidewater, New York	1.71	1.71	1.71	1.76
Beams, Pittsburgh	1.55	1.55	1.55	1.60
Angles, tidewater, New York	1.71	1.71	1.71	1.76
Angles, Pittsburgh	1.55	1.55	1.55	1.60
Skelp, grooved steel, Pittsburgh	*1.50*	1.50	1.60	1.45
Skelp, sheared steel, Pittsburgh	*1.60*	1.60	1.65	1.50
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents
Sheets, black, No. 28, Pittsburgh	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh*	**1.85**	1.85	1.80	1.95
Cut nails, Pittsburgh	**1.85**	1.85	1.80	1.75
Barb wire, galv., Pittsburgh*	**2.15**	2.15	2.10	2.40
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**14.12½**	14.00	13.75	14.75
Electrolytic copper, New York	**13.87½**	13.75	13.37½	14.25
Spelter, New York	*6.25*	6.30	6.37½	5.20
Spelter, St. Louis	*6.12½*	6.15	6.20	5.05
Lead, New York	**4.70**	4.70	4.40	4.20
Lead, St. Louis	**4.65**	4.65	4.30	4.10
Tin, New York	**32.85**	33.40	32.25	28.15
Antimony, Hallett, New York	**8.25**	8.25	8.12½	8.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.84	$3.89

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier, 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

Plates.—Tank plates, ⅜ in. thick, 6¼ in. up to 100 in. wide, 1.55c. to 1.60c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide, ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete circles	.20
Boiler and flange steel plates	.10
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 to 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe which went into effect January 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in	70	54	65	..
⅜ in	71	57	66	52
½ in	74	62	69	57
¾ to 6 in	78	68	73	63
7 to 12 in	72	57	68	53
Plugged and Reamed.				
1 to 4 in	76	66	71	61
Extra Strong, Plain Ends.				
⅛ to ⅜ in	63	51	58	46
¼ to 4 in	70	58	65	53
4½ to 8 in	66	54	61	49
Double Extra Strong, Plain Ends.				
½ to 8 in	59	48	54	43

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in	49	43
1¾ to 2¼ in	61	43
2½ in	63	48
2¾ to 3 in	69	55
6 to 13 in	60	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $33.

Steel Rivets.—Structural rivets, 2.15c., base; boiler rivets, 2.25c., base, subject to usual extras.

Pittsburgh.

PARK BUILDING, January 12, 1910.—(*By Telegraph.*)

Pig Iron.—Consumers of all grades of pig iron are pretty well covered on their requirements for some time ahead, and as a result there is not much new buying, with but little inquiry. Probably the largest transaction of the week was a sale of about 2000 tons of No. 2 foundry iron to a local interest for first half delivery at about $17, Valley furnace, for first quarter and $17.25 to $17.50 for second quarter. A local steel interest has bought about 1000 tons of basic iron for this quarter at about $17, Valley furnace. Reports have been current here that the 15,000 tons of basic iron held by a Pittsburgh capitalist had been sold to a large local interest, but this is denied by the reported buyer. The iron is piled in a furnace yard not far from this city, and is said to be held for $18 at furnace. We quote standard Bessemer iron, $19, for delivery over first half; basic, $17, for delivery in first quarter; malleable Bessemer, $17.25; No. 2 foundry, $17, and gray forge, $16.50, all at Valley furnace, the freight rate to the Pittsburgh District being 90c. a ton.

Steel.—There is but little new inquiry, but the steel market is firm. Consumption is as heavy as ever, consumers taking out steel promptly on their contracts, and the mills are still considerably behind in deliveries. We quote $27.50 for Bessemer billets and $28 to $28.50 for open hearth, maker's mill; sheet and tin bars for first quarter $29, maker's mill; forging billets, $31 to $32, maker's mill.

(*By Mail.*)

Following the heavy specifications for finished iron and steel sent in by consumers in November and December, the market is naturally quiet, and probably will continue so during this month and in February. Many records were broken in December in specifications entered by the mills, this being particularly the case in sheets and tin plate, and with the large stocks now held by jobbers and consumers the new demand is bound to be quiet until such stocks have been worked off. While there is uneasiness in some quarters, the present quiet condition of the market is believed to be a natural one and should not be taken to indicate that 1910 is not going to be a most prosperous year in the steel business. The leading steel interests are practically sold up on finished products for the first quarter, while on sheets and tin plate the engagements of some of the larger mills are such that they will have little or no tonnage to spare for delivery this side of July. Higher prices of ore and coke for this year, about 50c. a ton on ore and $1 on coke, would seem to preclude the probability of any material decline in prices of pig iron, and hence steel billets and finished material will hardly be any lower. The demand for pig iron for the past week has been dull, large consumers being pretty well covered. There is not much inquiry for steel. While the demand on most lines of finished material is quiet, specifications are coming into the mills very freely, the output and shipments being as heavy now as at any time since last May, when the upward movement started. Two weak items are coke and scrap, both being dull in demand and lower in price. It is believed that early in February these conditions will materially improve.

Ferromanganese.—With little new inquiry, the market is fairly strong. We note a sale of one car, or about 30 tons, for prompt delivery on the basis of $44.50, Baltimore. The import freight rate on ferromanganese has been ruled out, and only the domestic rate now applies, this being $2.30 from seaboard to Pittsburgh. We continue to quote 80 per cent. foreign $44 to $44.50, seaboard, for prompt shipment, and $45 for first half, plus the rate of $2.30 for delivery in the Pittsburgh District.

Ferrosilicon.—This market is very quiet. We quote 10 per cent. at $23.90; 11 per cent., $24.90; 12 per cent., $25.90, and 50 per cent., $62 to $62.50, Pittsburgh, for prompt shipment.

Muck Bar.—No sales have been reported in this district for some time. We continue to quote best grades of bar made from all pig iron at $30 in random lengths, and light bar $30.25 in cut lengths, f.o.b. Pittsburgh.

Wire Rods.—While the rod market is firm there is little inquiry, consumers being pretty well covered on contracts placed some time ago and at prices lower than are ruling now. Specifications have been coming in freely on these contracts until recently, when they dropped off to some extent. The two leading makers of rods are not actively seeking new business, needing their entire output for their own wire mills. We quote Bessemer, open hearth and chain rods at $33 for forward delivery.

Skelp.—New inquiry is quiet and several mills are willing to make concessions over prices they were asking a month or six weeks ago. We quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.75c. to 1.80c., and sheared iron skelp, 1.90c., all for ordinary widths and gauges, f.o.b. Pittsburgh.

Steel Rails.—Last week the Carnegie Steel Company entered new orders for 6500 to 7000 tons of standard sections and a little over 2000 tons of light rails. Nothing definite has yet developed in regard to the rail inquiry of the Baltimore & Ohio Railroad, but it is expected that this business will be placed in a short time. We quote steel axles at 1.75c. to 1.80c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Plates.—The Norfolk & Western Railroad is in the market for 3250 steel cars, the Chesapeake & Ohio for 1500 cars, mostly with steel underframes, and the Nickel Plate for 2000. Leading mills are about as far behind in deliveries on plates as ever, and, while new orders being placed are not as heavy as they were some time ago, specifications on contracts continue to come in freely. The large makers are pretty well filled through the first quarter and have a good many orders booked for shipment in second quarter. The market is firm, and we quote ¼-in. and heavier plates at 1.55c. in large lots and 1.60c. to 1.65c. in small lots for prompt shipment.

Structural Material.—The McClintic-Marshall Construction Company has taken 5000 tons of steel for an erecting shop and hammer shop for the Davenport Locomotive Works, at Davenport, Iowa; 700 tons for steel buildings for the National Malleable Castings Company, at Melrose Park, Chicago, and has received specifications for about 4000 tons of material for bridges for the Missouri Pacific Railway. The American Bridge Company has taken several nice jobs during the week, one of which, it is reported, will take 5000 to 6000 tons. While deliveries by the mills are still unsatisfactory, they seem to be catching up to some extent. The Erie Engine Works, Erie, Pa., is receiving bids on about 700 tons of steel for new buildings. We quote beams and channels up to 15-in. at 1.55c., at mill, while small lots for spot shipment bring 1.60c. to 1.65c., at mill.

Tin Plate.—Specifications on contracts for tin plate are being received by the mills at an enormous rate, and the leading mills have most of their product for the first six months of this year under contract. There are still some nice inquiries in the market by consumers who have evidently not bought enough to cover their requirements. It is reported that one of the leading can companies will build a factory adjacent to the plant of the Standard Tin Plate Company, at Canonsburg, Pa. The American Sheet & Tin Plate Company is operating close to 85 per cent. of its serviceable tin mill capacity, and its shipments of sheet and tin mill products in December were the heaviest in its history, except for one month. The market is firm. We quote 100-lb. cokes at $3.60 per base box, f.o.b. Pittsburgh, for delivery through the first quarter and half.

Sheets.—It is probable that deliveries by the mills on sheets and tin plate are further behind than on any other lines of finished material. The American Sheet & Tin Plate Company is practically sold up for first half, but can accept some light gauge black sheets for delivery in the latter part of April. The demand for special sheets, such as blue annealed and electrical, is exceedingly heavy, and in some cases premiums of $1 to $2 a ton are being paid for blue annealed sheets to some of the smaller mills that can make reasonably prompt shipments. All indications are that the sheet mills will run to their utmost capacity through the first half and probably through the entire year. Prices are very firm. We quote: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c., and Nos. 14 and 15, 1.95c.; one-pass box annealed No. 28 black sheets, 2.40c., and No. 28 galvanized, 3.50c., at mill. We quote corrugated roofing sheets at $1.70 per square for painted and $3 for galvanized, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

Bars.—While the new demand for iron and steel bars is quiet, specifications on contracts are coming in freely, and on steel bars the mills are apparently as far back in deliveries as they have been at any time. The new mills of the Carnegie Steel Company to be erected at Girard, Ohio, which will roll steel bars and sheets, will not be a factor in the trade until late in the year. All the leading steel bar mills are pretty well sold up through first quarter and have a great deal of business on their books for second quarter. The agricultural implement makers are specifying liberally on their contracts, and in some cases have recently come in the market and bought more, as they find they will need it. On contracts for delivery through first and second quarters several of the leading steel bar mills are naming 1.45c., at mill, but for prompt shipment 1.50c. to 1.55c. is being quoted. Iron bars are quite firm and are held at about 1.70c., Pittsburgh.

Hoops and Bands.—New orders are light, but specifications against contracts continue to come in at a fairly satisfactory rate. We quote steel hoops for forward delivery at 1.50c. to 1.55c., and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are firm at 1.45c. to 1.50c., on contracts for forward delivery, and 1.55c. to 1.60c. for reasonably prompt shipment.

Spelter.—Smelters seem to be trying to peg the market at 6.10c., East St. Louis. We note a sale of 100 tons to a local consumer at that price, equal to 6.22½c., Pittsburgh.

Spikes.—There is little doing in new buying, but the spike makers seem to have a pretty heavy business on their books placed some time ago, and which the railroads are taking out quite freely. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at $1.80 to $1.85 for first quarter. Boat spikes are firm, at $1.80, base, and small railroad spikes at $1.80, base. These prices are for carload and larger lots, 10c. per keg advance being charged for small lots.

Shafting.—Most consumers of shafting are covered by contracts placed at lower prices than are ruling now and against which they are specifying quite freely, but the amount of new business being placed is heavier than for some time.

Rivets.—Makers report the new demand quiet, but consumers are specifying liberally against contracts. We quote: Structural rivets, ¾ in. and larger, 2.15c., base; cone head boiler rivets, ¾ in. and larger, 2.25c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of $2 to $3 a ton to the small trade.

Wire Products.—A fairly active demand is noted for wire nails, but the cut nail market is quiet. Barb wire and fence wire are dull, consumers having covered ahead for some time in November and December. We quote wire nails at $1.85 in carload and larger lots; painted barb wire, $1.85; galvanized, $2.15; annealed fence wire, $1.65; galvanized, $1.95, and cut nails, $1.85, all f.o.b. cars, Pittsburgh, usual terms, with full freight to destination added.

Merchant Pipe.—The only large inquiry in the market at present for line pipe is that of the Arkansas Natural Gas Company, which is still figuring on the purchase of about 200 miles of 10 and 12 in. It is expected that this business will be placed in the early spring, when the prospective buyer shall have made financial arrangements for the purchase. Specifications against contracts for pipe are coming in fairly well; in December they were very heavy. It is stated that the jobbers are now carrying larger stocks of pipe in their warehouses than for some time. For this reason the mill demand for merchant sizes of pipe is expected to be rather quiet for the next month or so.

Boiler Tubes.—There is moderate buying of locomotive tubes by the railroads, and the demand for merchant tubes is also fairly heavy. Specifications against contracts in December for both locomotive and merchant tubes were large, but will probably show a falling off this month.

Iron and Steel Scrap.—There is no improvement in the demand for scrap, and prices on nearly all lines are weak and on some grades are lower. Most consumers of heavy steel scrap are covered for some time ahead, there being only one active buyer at present. We quote heavy steel scrap for delivery at Monessen, Steubenville, Sharon, Follansbee and Pittsburgh, at about $17.75, but in one case a sale was made at $17.50, delivered. On other grades dealers quote about as follows: No. 1 cast scrap, $16.50; No. 2, $15.50; bundled sheet scrap, said to be the weakest item on the whole list, $15.75 to $16; rerolling rails, $18.25 to $18.50, for delivery at Cumberland, Md., Newark and Columbus, Ohio; railroad malleable scrap, $15.75 to $16; grate bars, $12.75 to $13; No. 1 busheling, $15.25; No. 2, $11.75; low phosphorus melting stock, $21; iron axles, $20.50 to $20.75; steel axles, $21.25 to $21.50; locomotive axles, $27.75 to $28; old car wheels, $17.75 to $18; No. 1 railroad wrought scrap, $18.50 to $18.75; cast iron borings, $10.25 to $10.50, with no consumers wanting this material; sheet bar crop ends, $18.50 to $18.75, and machine shop turnings, $12.25 to $12.50, all per gross ton, f.o.b. Pittsburgh. We note sales of about 500 tons of low phosphorus melting stock at about $21.25, delivered, and about 300 tons of borings at about $10.50, delivered. The Pennsylvania Railroad list on the lines east on rails and scrap closed Tuesday, and most local scrap dealers have bid on it.

Coke.—This material continues dull, consumers of both furnace and foundry coke being covered by contracts for first half of the year. The output of coke for some time has been very heavy, and with lack of demand prices have sagged somewhat. Standard makes of furnace coke are being sold for spot shipment as low as $2.60 per net ton at oven, and we note a sale of 50 cars at that price for shipment this week. On contracts, $2.60 to $2.65 has been named recently on standard makes of furnace coke, but there are no inquiries from furnaces. Standard makes of 72-hour foundry coke are held at $2.90 to $3.25 per net ton at oven, the price depending largely on whether the producer of the coke is anxious for the order. The output of coke in the Upper and Lower Connellsville regions last week was about 435,000 tons.

Charles S. Bygate, formerly general sales agent of the Pickands-Magee Coke Company, has resigned and is now connected with the Whitney-Kemmerer Company, dealer in pig iron, coal and coke, with offices in rooms 621-622 Lewis Block, Pittsburgh, Pa.

The offices of the Dover Fire Brick Company, C. R. Dixon, sales manager, have been removed from the Fitzsimmons Building to the Diamond National Bank Building, Pittsburgh.

The Pittsburgh Testing Laboratory, with principal offices in Pittsburgh, Pa., has purchased a lot at the corner of Seventh and Bedford avenues, Pittsburgh, on which it will erect a five-story fireproof office and laboratory building. This has been found necessary to accommodate the rapidly increasing business. The company has established during the past year branch offices at Birmingham, Ala., and Pueblo, Colo.

Chicago.

FISHER BUILDING, January 12, 1910.—(*By Telegraph.*)

The severe winter weather which has prevailed throughout the West for more than a month has interfered seriously with railroad traffic and complaints are very general of car shortage and delays in getting materials. The motive power of the railroads has been running down for two or three years, as the number of locomotives built has not been equal to the annual loss, and the engines in use have not been kept up to the old standard of efficiency. The winter has been unusually cold and stormy and the freight carrying energy of the railroads has been exhausted in keeping the country supplied with coal. In many cases factories have been barely able to keep in operation, and under these conditions freight traffic has become badly congested. Even if the roads could furnish cars to meet the demand they would not have the motive power to forward shipments until weather conditions become more favorable. Fortunately this difficulty has been foreseen by industrial managers and they have safeguarded themselves as far as possible by accumulating stocks of materials. New industrial buying of steel products is comparatively light at present, attention being centered chiefly in getting deliveries where specifications were given several months ago. New rail business comes forward steadily from the railroads, the orders taken here last week amounting to 36,000 tons, chiefly open hearth rails for the Harriman lines. A considerable tonnage of new business is under negotiation with the Baltimore & Ohio, the Alton and other railroads. Specifications for track supplies continue very heavy. Chicago car builders booked an order for 2000 refrigerator cars from the Harriman lines last week, and there will undoubtedly be liberal orders for locomotives from the Western roads in the near future, as their lack of motive power restricts their earnings. Projects calling for structural steel are growing in number, limited only by the ability of the mills and fabricators to take care of the demand. It was supposed that buyers of wire products prior to the advance in December had covered their requirements for 60 days, but new buying has grown this month to 4000 to 6000 tons a day. The scrap market is very quiet, as there is nothing coming in and buyers are well supplied for the present, except in cast scrap, in which there has been a little flurry of inquiry for spot delivery.

Pig Iron.—The first important business in this market in about three months was closed last week, a large pipe interest having purchased over 25,000 tons of analysis iron for its foundry in Ohio. About half of this purchase represents Southern iron and about half Northern, the Northern being divided between Valley and southern Ohio furnaces, owing to the position of the foundry about midway between the Valley and southern Ohio districts. With Southern furnaces enjoying a little advantage over Northern under present conditions, the competition for the business was keen, but apparently did not develop any weakness in the market. New inquiries are reported here running from small lots up to 2500 tons, amounting to about 15,000 tons, of Southern iron, principally for second and third quarter, although one lot of 2000 tons is for first half. Apparently no business has been closed on these recent inquiries. For some time only two or three furnace interests would take business at $14 for first half, but this price is becoming more generally recognized, with $14.50 asked for third quarter by a leading Southern interest, which until recently asked $15 for first half. With good inquiries coming in the furnace interests are not so aggressive this week in seeking buyers, and $14 is considered the minimum, with a general belief among selling interests that this price will not last long. In Northern iron there are good inquiries for malleable Bessemer. One local inquiry is for 2000 tons and another from Moline, Ill., is for 2000 to 4000 tons for third quarter or last half. While no large inquiries have assumed tangible form for Northern foundry iron, the general feeling is better among Northern as well as Southern iron interests. The following prices are for January, February and March delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	19.50 to 20.00
Northern coke foundry, No. 2	19.00 to 19.50
Northern coke foundry, No. 3	18.50 to 19.00
Northern Scotch, No. 1	19.00 to 19.50
Southern coke, No. 1	18.85 to 19.35
Southern coke, No. 2	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.60 to 18.10
Southern coke, No. 1 soft	18.85 to 19.35
Southern coke, No. 2 soft	18.35 to 18.85
Southern gray forge	17.35 to 17.85
Southern mottled	17.10 to 17.60
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	21.40 to 21.90
Jackson Co. and Kentucky silvery, 6%	21.40 to 21.90
Jackson Co. and Kentucky silvery, 8%	22.40 to 22.90
Jackson Co. and Kentucky silvery, 10%	23.40 to 23.90

(*By Mail.*)

Billets.—There is no change in the situation in this market regarding billets. Consumers are dependent upon occasional offerings, which they can pick up from Eastern mills, as only a few large consumers are able to get either rolling or forging billets in this market. With the completion of new open hearth furnaces which are under way in this district there may be a limited supply available from local mills.

Rails and Track Supplies.—Orders for standard rails taken by the Illinois Steel Company last week amounted to 36,000 tons. This does not include any part of the Baltimore & Ohio tonnage, which has not been closed at this writing. It is understood that the greater part of the business taken last week was open hearth rails for Harriman roads, along with small miscellaneous lots of Bessemer rails for other railroads. Considerable new business is pending or in prospect from Western roads, which will undoubtedly be placed with Chicago mills. Specifications continue very heavy on track fastenings, covering contracts made last fall for 1910 delivery, and track bolts are quoted 10c. higher on new business. We quote standard railroad spikes at 1.80c., base; track bolts and square nuts, 2.40c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $26; 30 to 35 lb., $26.75; 16, 20 and 25 lb., $27; 12 lb., $28, Chicago, less 50c. a ton on lots of 500 tons and $1 a ton on lots over 500 tons.

Structural Material.—New structural contracts in Western territory were comparatively light last week. The American Steel Foundries has let contracts for additional shop buildings at Granite City, Ill., which will require 620 tons of material. The Gaiety Theatre in Chicago, 897 tons, went to the Brown-Ketcham Iron Works. The Plew Building, Chicago, 485 tons, will be erected with Bethlehem sections. For new stable and garage for the Denver Omnibus & Cab Company, Denver, Colo., F. O. Brown, a local contractor and fabricator will furnish the steel, 355 tons. The principal Western contract of the week, for the new plant of the American Rolling Mill Company, Middletown, Ohio, 4000 tons, was taken by the Pittsburgh office of the American Bridge Company. Nothing more is heard from the irregular prices on fabricated material which were in evidence in December, and it is not believed that fabricators have much material due them on old contracts or in stock to affect prices on new business. Where they have taken and paid for material and put it in stock they are not so likely to shade prices as they were when they had unspecified material due them from the mills on contracts which expired the first of the year. On plain fabricated material such as goes into an ordinary office building, the ruling price is about $50 per ton. This is about $6 less than the price that was paid three years ago for material which went into buildings like the Corn Exchange Bank. We quote plain material from mill, 1.78c. to 1.88c., Chicago; from store, 2c., Chicago.

Plates.—The principal new business in prospect grows out of a contract for 2000 refrigerator cars placed with the Pullman Company for the Harriman lines, these cars to have steel underframes. The plate mills in this district, however, have contracts that would carry them well into the summer without any new business, although it is expected that Western roads will find it necessary to place large car orders this winter or spring. Prices are very firm and the mills reluctant to take new business. We quote mill prices at 1.78c. to 1.88c., Chicago; store prices, 2c., Chicago.

Sheets.—There is no change in prices and the local mill is in fairly good shape regarding deliveries. Quite a little new business is coming forward this month, and it is very difficult to meet the demand for blue annealed sheets. The first of the eight new sheet mills of the Inland Steel Company will be ready for operation in February, and others will come along in rapid succession, thus making a large increase in the local supply of sheets during the coming year. We quote mill prices as follows, Chicago: No. 10 blue annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—There is much complaint among implement manufacturers and other large buyers of delay in getting deliveries. On ordinary sections the mills are keeping up with their specifications in fair shape, but on tees and odd sections there is no doubt that deliveries are backward. In recent years the implement manufacturers have made considerable progress in eliminating these odd sections and standardizing their business along the path of least resistance. For many years there was a tendency in the implement trade to adopt novelties as a means of attracting the attention and favor of the farmer, but they soon discovered that in a busy season it was very difficult to obtain from the mills anything odd or peculiar in the way of rolled material, and their experience this year will undoubtedly accelerate their efforts to adopt standard designs. The demand for bars from the implement manufacturers has broken all records and the mills are making every effort to supply them. Subject to the usual delay in delivery on soft steel bars, we quote as follows: Soft steel bars, 1.68c. to 1.78c.; bar iron, 1.60c. to 1.65c.; hard steel bars rolled from old rails, 1.58c. to 1.65c., all Chicago.

Rods and Wire.—It was generally supposed that jobbers and other buyers had fully covered their requirements for 60 days when the general advance in prices took effect early in December, but the demand for wire products continues to outrun all estimates, and new business has grown until it amounts to 4000 to 6000 tons a day for the leading interest, coming from both manufacturers and jobbers. The jobbing trade is limited to purchases for 60 days' requirements, but manufacturing consumers are generally covered to April 1, and in some cases, where the necessity is clearly apparent, they have covered their requirements to July 1. Not much complaint is heard regarding deliveries, but the car shortage and inability of the railroads to keep freight moving may cause a shortage of wire material before the winter is over. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—New business is comparatively light, except from machinery manufacturers. The agricultural implement makers who use enormous quantities of special steels have generally specified for their requirements for spring and early summer trade, and their interest centers at the present time in getting shipments on what they specified last fall in time to complete their product for spring trade. In many cases these consumers of steel find that they could have done more business if they could get more material, this old established industry being in the same position in that respect as the automobile manufacturers, some of whom have found they will not be able to complete more than 75 per cent. of the product which they started out to make for this year, owing to the difficulty in getting special grades of steel which they use.

Cast Iron Pipe.—No lettings of moment are reported for the past week. There is a fair volume of routine business with jobbers and railroads and other buyers, and inquiries are coming forward which indicate that there will be considerable business in the near future in the way of formal lettings from municipalities. Prices are unchanged, but firm. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Metals.—Copper is stronger again this week and in the jobbing trade in Chicago 13¾c. is quoted in car lots as the going price for casting copper and 14¾c. for lake. Prices of spelter continue more or less irregular, with a considerable spread between the inside price to large consumers and the prices which jobbers can make on carloads to casual buyers. Tin is a shade easier and dealers are not carrying large stocks. We quote as follows: Casting copper, 13¾c.; lake, 14¼c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33¾c.; small lots, 35c. to 36c.; lead, desilverized, 4.75c. to 4.80c., for 50-ton lots; corroding, 5c. to 5.05c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.15c. to 6.25c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $8, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¾c.; copper bottoms, 12c.; copper clips, 13½c.; red brass, 12½c.; yellow brass, 10c.; light brass, 7c.; lead pipe, 4½c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 28c.

Old Material.—There has been a little flurry in cast scrap the past few days, in striking contrast with the dullness that has prevailed for two months in practically everything else in the way of old material. In some cases foundries have paid as high as $15.50 for No. 1 cast for immediate delivery, although 10 days ago a dealer with this material on track had difficulty in moving it at $14.50. This movement in cast scrap and the general dullness in everything else grow out of the same cause, the stormbound condition of the country, which has reduced the movement of scrap to almost nothing. The principal buyers of rolling mill and steel scrap accumulated large stocks last fall, when material was plentiful, and they have not been affected by the light movement of the past two months, although they have been willing to take the small lots that were offered them by dealers at current prices. At one time local buyers of heavy melting steel attempted to reduce their delivered price to $15.50, but Eastern buyers immediately came into the market and began taking material for shipment to Eastern mills. A few days' trial showed that the $15.50 price was not tenable, and since then there has been a market around $16 for all the melting steel that seeks a buyer in this market, with corresponding prices for shoveling steel, No. 2 railroad wrought, heavy busheling scrap and special lines of material which now go into open hearth steel. This "base" price for heavy melting steel has accounted for the peculiar steadiness in practically all lines of scrap during the past three months. Cast scrap weakened during November and December, in sympathy with pig iron, as scrap at $15 per net ton costs more than Southern iron on old contracts at $12, Birmingham. Now that $18.35, Chicago, has become the minimum for Southern iron, a good many inquiries are coming in for cast scrap. Dealers have been doing very little business in malleable scrap, as the foundries have been making exchange contracts with the railroads to cover their current requirements. The following prices are per gross ton, delivered, Chicago:

Old iron rails	$20.00 to $20.50
Old steel rails, rerolling	18.00 to 18.50
Old steel rails, less than 3 ft	17.25 to 17.75
Relaying rails, standard sections, subject to inspection	23.50 to 24.50
Old car wheels	18.50 to 19.00
Heavy melting steel scrap	16.00 to 16.50
Frogs, switches and guards, cut apart	16.00 to 16.50
Shoveling steel	15.50 to 16.00

The following quotations are per net ton:

Iron angles and splice bars	$17.50 to $18.00
Iron car axles	21.50 to 22.00
Steel car axles	20.50 to 21.00
No. 1 railroad wrought	14.75 to 15.25
No. 2 railroad wrought	13.75 to 14.25
Springs, knuckles and couplers	14.75 to 15.25
Locomotive tires, smooth	18.50 to 19.00
No. 1 dealers' forge	12.50 to 13.00
Steel axle turnings	12.00 to 12.50
Machine shop turnings	10.50 to 11.00
Cast and mixed borings	7.50 to 8.00
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.75 to 10.25
No. 1 boilers, cut to sheets and rings	11.50 to 12.00
No. 1 cast scrap	15.00 to 15.50
Stove plate and light cast scrap	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	13.00 to 13.50
Pipes and flues	11.50 to 12.00

Philadelphia.

PHILADELPHIA, PA., January 11, 1910.

The market generally has been rather quiet, although indications of an early recovery are observed. Producers of both crude and finished materials are in an exceedingly strong position, order books being comfortably filled, furnaces and mills operating at full capacity, deliveries being freely taken, and, in some cases, being urged, indicating an increasing consumption. Transportation facilities, which were greatly handicapped by the recent storms in this territory, have again about reached normal. Prices in all lines are practically unchanged. Quotations are well maintained and no effort is being made by producers to force business, the general quiet conditions of the market being customary at this season, when affairs incident to the closing of the year claim a large share of attention.

Pig Iron.—There has been some scattered buying, particularly in the foundry grades. Steel making and puddling grades have been quiet, although several sales of low phosphorus iron are reported. There has probably been less small lot buying in foundry iron. Several consumers in this territory have, however, made moderate purchases to piece out requirements. Some few inquiries for requirements during the first quarter and half of the year are in hand and one or two sales of fair sized lots of No. 2 X and No. 2 plain, for the latter delivery, have been made at $19, delivered, for the former, and $18.50 for the latter. A few sales of both of these grades in quantities ranging from 100 to 500 tons, for comparatively early delivery, are also reported at the same figures. The cast iron pipe foundries continue to take moderate lots of low grade iron, largely forge and off basic, at prices varying according to conditions, sales aggregating several thousand tons having been made. Several of the pipe foundries are still in the market and will make further purchases if the iron can be had at prices satisfactory to the buyers. Not much movement in Virginia foundry iron for delivery in this territory is reported. Sales of small lots have been made at the recent level, $16, furnace, equal to $19 to $19.25, delivered in this territory, for No. 2 X. The market has, however, not been seriously tested. No particular movement in Southern iron is reported. No. 2 foundry can be had at $14, Birmingham, for first quarter delivery, while Southern forge has been offered at $13, Birmingham, with no sales. There is still considerable inquiry for low phosphorus iron. Several sales to steel casting plants in this territory, aggregating from 800 to 1000 tons, at prices ranging from $22.75 to $23.25, delivered, are reported. One fair sized lot was sold for Western delivery. Basic iron continues quiet. Buyers are pretty well taken care of as far as near future requirements are concerned and will not consider further purchases except at a price concession. Producers, however, are in a strong position, having about all the business they want at the time, and maintain firmly the recent quotation of $18.75, delivered, for that grade. The general tone of the market is strong. Heavy deliveries on expiring contracts were made by the furnaces prior to the year end, and while it temporarily inconvenienced some consumers to take in the iron, shipments were fully taken. In some instances deliveries on foundry iron are being urged by melters, who find their requirements have, to some extent, exceeded their anticipation. Prices of standard brands have been very firmly maintained and there appears to be no disposition to make any concessions from recent quotations, which for delivery in buyers' yards, east-

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide, ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete circles	.20
Boiler and flange steel plates	.10
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 to 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe which went into effect January 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in	70	54	65	..
⅜ in	71	57	66	52
½ in	74	62	69	57
¾ to 6 in	78	68	73	63
7 to 12 in	72	57	68	53
Plugged and Reamed.				
1 to 4 in	76	66	71	61
Extra Strong, Plain Ends.				
⅛ to ⅜ in	63	51	58	46
¼ to 4 in	70	58	65	53
4½ to 8 in	66	54	61	49
Double Extra Strong, Plain Ends.				
½ to 8 in	59	48	54	43

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in	49	43
1¾ to 2¼ in	61	43
2½ in	63	48
2¾ to 5 in	69	55
6 to 13 in	60	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $33.

Steel Rivets.—Structural rivets, 2.15c., base; boiler rivets, 2.25c., base, subject to usual extras.

Pittsburgh.

PARK BUILDING, January 12, 1910.—(*By Telegraph.*)

Pig Iron.—Consumers of all grades of pig iron are pretty well covered on their requirements for some time ahead, and as a result there is not much new buying, with but little inquiry. Probably the largest transaction of the week was a sale of about 2000 tons of No. 2 foundry iron to a local interest for first half delivery at about $17, Valley furnace, for first quarter and $17.25 to $17.50 for second quarter. A local steel interest has bought about 1000 tons of basic iron for this quarter at about $17, Valley furnace. Reports have been current here that the 15,000 tons of basic iron held by a Pittsburgh capitalist had been sold to a large local interest, but this is denied by the reported buyer. The iron is piled in a furnace yard not far from this city, and is said to be held for $18 at furnace. We quote standard Bessemer iron, $19, for delivery over first half; basic, $17, for delivery in first quarter; malleable Bessemer, $17.25; No. 2 foundry, $17, and gray forge, $16.50, all at Valley furnace, the freight rate to the Pittsburgh District being 90c. a ton.

Steel.—There is but little new inquiry, but the steel market is firm. Consumption is as heavy as ever, consumers taking out steel promptly on their contracts, and the mills are still considerably behind in deliveries. We quote $27.50 for Bessemer billets and $28 to $28.50 for open hearth, maker's mill; sheet and tin bars for first quarter $29, maker's mill; forging billets, $31 to $32, maker's mill.

(*By Mail.*)

Following the heavy specifications for finished iron and steel sent in by consumers in November and December, the market is naturally quiet, and probably will continue so during this month and in February. Many records were broken in December in specifications entered by the mills, this being particularly the case in sheets and tin plate, and with the large stocks now held by jobbers and consumers the new demand is bound to be quiet until such stocks have been worked off. While there is uneasiness in some quarters, the present quiet condition of the market is believed to be a natural one and should not be taken to indicate that 1910 is not going to be a most prosperous year in the steel business. The leading steel interests are practically sold up on finished products for the first quarter, while on sheets and tin plate the engagements of some of the larger mills are such that they will have little or no tonnage to spare for delivery this side of July. Higher prices of ore and coke for this year, about 50c. a ton on ore and $1 on coke, would seem to preclude the probability of any material decline in prices of pig iron, and hence steel billets and finished material will hardly be any lower. The demand for pig iron for the past week has been dull, large consumers being pretty well covered. There is not much inquiry for steel. While the demand on most lines of finished material is quiet, specifications are coming into the mills very freely, the output and shipments being as heavy now as at any time since last May, when the upward movement started. Two weak items are coke and scrap, both being dull in demand and lower in price. It is believed that early in February these conditions will materially improve.

Ferromanganese.—With little new inquiry, the market is fairly strong. We note a sale of one car, or about 30 tons, for prompt delivery on the basis of $44.50, Baltimore. The import freight rate on ferromanganese has been ruled out, and only the domestic rate now applies, this being $2.30 from seaboard to Pittsburgh. We continue to quote 80 per cent. foreign $44 to $44.50, seaboard, for prompt shipment, and $45 for first half, plus the rate of $2.30 for delivery in the Pittsburgh District.

Ferrosilicon.—This market is very quiet. We quote 10 per cent. at $23.90; 11 per cent., $24.90; 12 per cent., $25.90, and 50 per cent., $62 to $62.50, Pittsburgh, for prompt shipment.

Muck Bar.—No sales have been reported in this district for some time. We continue to quote best grades of bar made from all pig iron at $30 in random lengths, and light bar $30.25 in cut lengths, f.o.b. Pittsburgh.

Wire Rods.—While the rod market is firm there is little inquiry, consumers being pretty well covered on contracts placed some time ago and at prices lower than are ruling now. Specifications have been coming in freely on these contracts until recently, when they dropped off to some extent. The two leading makers of rods are not actively seeking new business, needing their entire output for their own wire mills. We quote Bessemer, open hearth and chain rods at $33 for forward delivery.

Skelp.—New inquiry is quiet and several mills are willing to make concessions over prices they were asking a month or six weeks ago. We quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.75c. to 1.80c., and sheared iron skelp, 1.90c., all for ordinary widths and gauges, f.o.b. Pittsburgh.

Steel Rails.—Last week the Carnegie Steel Company entered new orders for 6500 to 7000 tons of standard sections and a little over 2000 tons of light rails. Nothing definite has yet developed in regard to the rail inquiry of the Baltimore & Ohio Railroad, but it is expected that this business will be placed in a short time. We quote steel axles at 1.75c. to 1.80c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Plates.—The Norfolk & Western Railroad is in the market for 3250 steel cars, the Chesapeake & Ohio for 1500 cars, mostly with steel underframes, and the Nickel Plate for 2000. Leading mills are about as far behind in deliveries on plates as ever, and, while new orders being placed are not as heavy as they were some time ago, specifications on contracts continue to come in freely. The large makers are pretty well filled through the first quarter and have a good many orders booked for shipment in second quarter. The market is firm, and we quote ¼-in. and heavier plates at 1.55c. in large lots and 1.60c. to 1.65c. in small lots for prompt shipment.

Structural Material.—The McClintic-Marshall Construction Company has taken 5000 tons of steel for an erecting shop and hammer shop for the Davenport Locomotive Works, at Davenport, Iowa; 700 tons for steel buildings for the National Malleable Castings Company, at Melrose Park, Chicago, and has received specifications for about 4000 tons of material for bridges for the Missouri Pacific Railway. The American Bridge Company has taken several nice jobs during the week, one of which, it is reported, will take 5000 to 6000 tons. While deliveries by the mills are still unsatisfactory, they seem to be catching up to some extent. The Erie Engine Works, Erie, Pa., is receiving bids on about 700 tons of steel for new buildings. We quote beams and channels up to 15-in. at 1.55c., at mill, while small lots for spot shipment bring 1.60c. to 1.65c., at mill.

Tin Plate.—Specifications on contracts for tin plate are being received by the mills at an enormous rate, and the leading mills have most of their product for the first six months of this year under contract. There are still some nice inquiries in the market by consumers who have evidently not bought enough to cover their requirements. It is reported that one of the leading can companies will build a factory adjacent to the plant of the Standard Tin Plate Company, at Canonsburg, Pa. The American Sheet & Tin Plate Company is operating close to 85 per cent. of its serviceable tin mill capacity, and its shipments of sheet and tin mill products in December were the heaviest in its history, except for one month. The market is firm. We quote 100-lb. cokes at $3.60 per base box, f.o.b. Pittsburgh, for delivery through the first quarter and half.

Sheets.—It is probable that deliveries by the mills on sheets and tin plate are further behind than on any other lines of finished material. The American Sheet & Tin Plate Company is practically sold up for first half, but can accept some light gauge black sheets for delivery in the latter part of April. The demand for special sheets, such as blue annealed and electrical, is exceedingly heavy, and in some cases premiums of $1 to $2 a ton are being paid for blue annealed sheets to some of the smaller mills that can make reasonably prompt shipments. All indications are that the sheet mills will run to their utmost capacity through the first half and probably through the entire year. Prices are very firm. We quote: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c., and Nos. 14 and 15, 1.95c.; one-pass box annealed No. 28 black sheets, 2.40c., and No. 28 galvanized, 3.50c., at mill. We quote corrugated roofing sheets at $1.70 per square for painted and $3 for galvanized, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

Bars.—While the new demand for iron and steel bars is quiet, specifications on contracts are coming in freely, and on steel bars the mills are apparently as far back in deliveries as they have been at any time. The new mills of the Carnegie Steel Company to be erected at Girard, Ohio, which will roll steel bars and sheets, will not be a factor in the trade until late in the year. All the leading steel bar mills are pretty well sold up through first quarter and have a great deal of business on their books for second quarter. The agricultural implement makers are specifying liberally on their contracts, and in some cases have recently come in the market and bought more, as they find they will need it. On contracts for delivery through first and second quarters several of the leading steel bar mills are naming 1.45c., at mill, but for prompt shipment 1.50c. to 1.55c. is being quoted. Iron bars are quite firm and are held at about 1.70c., Pittsburgh.

Hoops and Bands.—New orders are light, but specifications against contracts continue to come in at a fairly satisfactory rate. We quote steel hoops for forward delivery at 1.50c. to 1.55c., and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are firm at 1.45c. to 1.50c.; on contracts for forward delivery, and 1.55c. to 1.60c. for reasonably prompt shipment.

Spelter.—Smelters seem to be trying to peg the market at 6.10c., East St. Louis. We note a sale of 100 tons to a local consumer at that price, equal to 6.22½c., Pittsburgh.

Spikes.—There is little doing in new buying, but the spike makers seem to have a pretty heavy business on their books placed some time ago, and which the railroads are taking out quite freely. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at $1.80 to $1.85 for first quarter. Boat spikes are firm, at $1.80, base, and small railroad spikes at $1.80, base. These prices are for carload and larger lots, 10c. per keg advance being charged for small lots.

Shafting.—Most consumers of shafting are covered by contracts placed at lower prices than are ruling now and against which they are specifying quite freely, but the amount of new business being placed is heavier than for some time.

Rivets.—Makers report the new demand quiet, but consumers are specifying liberally against contracts. We quote: Structural rivets, ¾ in. and larger, 2.15c., base; cone head boiler rivets, ¾ in. and larger, 2.25c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of $2 to $3 a ton to the small trade.

Wire Products.—A fairly active demand is noted for wire nails, but the cut nail market is quiet. Barb wire and fence wire are dull, consumers having covered ahead for some time in November and December. We quote wire nails at $1.85 in carload and larger lots; painted barb wire, $1.85; galvanized, $2.15; annealed fence wire, $1.65; galvanized, $1.95, and cut nails, $1.85, all f.o.b. cars, Pittsburgh, usual terms, with full freight to destination added.

Merchant Pipe.—The only large inquiry in the market at present for line pipe is that of the Arkansas Natural Gas Company, which is still figuring on the purchase of about 200 miles of 10 and 12 in. It is expected that this business will be placed in the early spring, when the prospective buyer shall have made financial arrangements for the purchase. Specifications against contracts for pipe are coming in fairly well; in December they were very heavy. It is stated that the jobbers are now carrying larger stocks of pipe in their warehouses than for some time. For this reason the mill demand for merchant sizes of pipe is expected to be rather quiet for the next month or so.

Boiler Tubes.—There is moderate buying of locomotive tubes by the railroads, and the demand for merchant tubes is also fairly heavy. Specifications against contracts in December for both locomotive and merchant tubes were large, but will probably show a falling off this month.

Iron and Steel Scrap.—There is no improvement in the demand for scrap, and prices on nearly all lines are weak and on some grades are lower. Most consumers of heavy steel scrap are covered for some time ahead, there being only one active buyer at present. We quote heavy steel scrap for delivery at Monessen, Steubenville, Sharon, Follansbee and Pittsburgh, at about $17.75, but in one case a sale was made at $17.50, delivered. On other grades dealers quote about as follows: No. 1 cast scrap, $16.50; No. 2, $15.50; bundled sheet scrap, said to be the weakest item on the whole list, $15.75 to $16; rerolling rails, $18.25 to $18.50, for delivery at Cumberland, Md., Newark and Columbus, Ohio; railroad malleable scrap, $15.75 to $16; grate bars, $12.75 to $13; No. 1 busheling, $15.25; No. 2, $11.75; low phosphorus melting stock, $21; iron axles, $20.50 to $20.75; steel axles, $21.25 to $21.50; locomotive axles, $27.75 to $28; old car wheels, $17.75 to $18; No. 1 railroad wrought scrap, $18.50 to $18.75; cast iron borings, $10.25 to $10.50, with no consumers wanting this material; sheet bar crop ends, $18.50 to $18.75, and machine shop turnings, $12.25 to $12.50, all per gross ton, f.o.b. Pittsburgh. We note sales of about 500 tons of low phosphorus melting stock at about $21.25, delivered, and about 300 tons of borings at about $10.50, delivered. The Pennsylvania Railroad list on the lines east on rails and scrap closed Tuesday, and most local scrap dealers have bid on it.

Coke.—This material continues dull, consumers of both furnace and foundry coke being covered by contracts for first half of the year. The output of coke for some time has been very heavy, and with lack of demand prices have sagged somewhat. Standard makes of furnace coke are being sold for spot shipment as low as $2.60 per net ton at oven, and we note a sale of 50 cars at that price for shipment this week. On contracts, $2.60 to $2.65 has been named recently on standard makes of furnace coke, but there are no inquiries from furnaces. Standard makes of 72-hour foundry coke are held at $2.90 to $3.25 per net ton at oven, the price depending largely on whether the producer of the coke is anxious for the order. The output of coke in the Upper and Lower Connellsville regions last week was about 435,000 tons.

Charles S. Bygate, formerly general sales agent of the Pickands-Magee Coke Company, has resigned and is now connected with the Whitney-Kemmerer Company, dealer in pig iron, coal and coke, with offices in rooms 621-622 Lewis Block, Pittsburgh, Pa.

The offices of the Dover Fire Brick Company, C. R. Dixon, sales manager, have been removed from the Fitzsimmons Building to the Diamond National Bank Building, Pittsburgh.

The Pittsburgh Testing Laboratory, with principal offices in Pittsburgh, Pa., has purchased a lot at the corner of Seventh and Bedford avenues, Pittsburgh, on which it will erect a five-story fireproof office and laboratory building. This has been found necessary to accommodate the rapidly increasing business. The company has established during the past year branch offices at Birmingham, Ala., and Pueblo, Colo.

Chicago.

FISHER BUILDING, January 12, 1910.—(*By Telegraph.*)

The severe winter weather which has prevailed throughout the West for more than a month has interfered seriously with railroad traffic and complaints are very general of car shortage and delays in getting materials. The motive power of the railroads has been running down for two or three years, as the number of locomotives built has not been equal to the annual loss, and the engines in use have not been kept up to the old standard of efficiency. The winter has been unusually cold and stormy and the freight carrying energy of the railroads has been exhausted in keeping the country supplied with coal. In many cases factories have been barely able to keep in operation, and under these conditions freight traffic has become badly congested. Even if the roads could furnish cars to meet the demand they would not have the motive power to forward shipments until weather conditions become more favorable. Fortunately this difficulty has been foreseen by industrial managers and they have safeguarded themselves as far as possible by accumulating stocks of materials. New industrial buying of steel products is comparatively light at present, attention being centered chiefly in getting deliveries where specifications were given several months ago. New rail business comes forward steadily from the railroads, the orders taken here last week amounting to 36,000 tons, chiefly open hearth rails for the Harriman lines. A considerable tonnage of new business is under negotiation with the Baltimore & Ohio, the Alton and other railroads. Specifications for track supplies continue very heavy. Chicago car builders booked an order for 2000 refrigerator cars from the Harriman lines last week, and there will undoubtedly be liberal orders for locomotives from the Western roads in the near future, as their lack of motive power restricts their earnings. Projects calling for structural steel are growing in number, limited only by the ability of the mills and fabricators to take care of the demand. It was supposed that buyers of wire products prior to the advance in December had covered their requirements for 60 days, but new buying has grown this month to 4000 to 6000 tons a day. The scrap market is very quiet, as there is nothing coming in and buyers are well supplied for the present, except in cast scrap, in which there has been a little flurry of inquiry for spot delivery.

Pig Iron.—The first important business in this market in about three months was closed last week, a large pipe interest having purchased over 25,000 tons of analysis iron for its foundry in Ohio. About half of this purchase represents Southern iron and about half Northern, the Northern being divided between Valley and southern Ohio furnaces, owing to the position of the foundry about midway between the Valley and southern Ohio districts. With Southern furnaces enjoying a little advantage over Northern under present conditions, the competition for the business was keen, but apparently did not develop any weakness in the market. New inquiries are reported here running from small lots up to 2500 tons, amounting to about 15,000 tons, of Southern iron, principally for second and third quarter, although one lot of 2000 tons is for first half. Apparently no business has been closed on these recent inquiries. For some time only two or three furnace interests would take business at $14 for first half, but this price is becoming more generally recognized, with $14.50 asked for third quarter by a leading Southern interest, which until recently asked $15 for first half. With good inquiries coming in the furnace interests are not so aggressive this week in seeking buyers, and $14 is considered the minimum, with a general belief among selling interests that this price will not last long. In Northern iron there are good inquiries for malleable Bessemer. One local inquiry is for 2000 tons and another from Moline, Ill., is for 2000 to 4000 tons for third quarter or last half. While no large inquiries have assumed tangible form for Northern foundry iron, the general feeling is better among Northern as well as Southern iron interests. The following prices are for January, February and March delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	19.50 to 20.00
Northern coke foundry, No. 2	19.00 to 19.50
Northern coke foundry, No. 3	18.50 to 19.00
Northern Scotch, No. 1	19.00 to 19.50
Southern coke, No. 1	18.85 to 19.35
Southern coke, No. 2	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.60 to 18.10
Southern coke, No. 1 soft	18.85 to 19.35
Southern coke, No. 2 soft	18.35 to 18.85
Southern gray forge	17.35 to 17.85
Southern mottled	17.10 to 17.60
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	21.40 to 21.90
Jackson Co. and Kentucky silvery, 6%	21.40 to 21.90
Jackson Co. and Kentucky silvery, 8%	22.40 to 22.90
Jackson Co. and Kentucky silvery, 10%	23.40 to 23.90

(*By Mail.*)

Billets.—There is no change in the situation in this market regarding billets. Consumers are dependent upon occasional offerings, which they can pick up from Eastern mills, as only a few large consumers are able to get either rolling or forging billets in this market. With the completion of new open hearth furnaces which are under way in this district there may be a limited supply available from local mills.

Rails and Track Supplies.—Orders for standard rails taken by the Illinois Steel Company last week amounted to 36,000 tons. This does not include any part of the Baltimore & Ohio tonnage, which has not been closed at this writing. It is understood that the greater part of the business taken last week was open hearth rails for Harriman roads, along with small miscellaneous lots of Bessemer rails for other railroads. Considerable new business is pending or in prospect from Western roads, which will undoubtedly be placed with Chicago mills. Specifications continue very heavy on track fastenings, covering contracts made last fall for 1910 delivery, and track bolts are quoted 10c. higher on new business. We quote standard railroad spikes at 1.80c., base; track bolts and square nuts, 2.40c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $26; 30 to 35 lb., $26.75; 16, 20 and 25 lb., $27; 12 lb., $28, Chicago, less 50c. a ton on lots of 500 tons and $1 a ton on lots over 500 tons.

Structural Material.—New structural contracts in Western territory were comparatively light last week. The American Steel Foundries has let contracts for additional shop buildings at Granite City, Ill., which will require 620 tons of material. The Gaiety Theatre in Chicago, 897 tons, went to the Brown-Ketcham Iron Works. The Plew Building, Chicago, 485 tons, will be erected with Bethlehem sections. For new stable and garage for the Denver Omnibus & Cab Company, Denver, Colo., F. O. Brown, a local contractor and fabricator will furnish the steel, 355 tons. The principal Western contract of the week, for the new plant of the American Rolling Mill Company, Middletown, Ohio, 4000 tons, was taken by the Pittsburgh office of the American Bridge Company. Nothing more is heard from the irregular prices on fabricated material which were in evidence in December, and it is not believed that fabricators have much material due them on old contracts or in stock to affect prices on new business. Where they have taken and paid for material and put it in stock they are not so likely to shade prices as they were when they had unspecified material due them from the mills on contracts which expired the first of the year. On plain fabricated material such as goes into an ordinary office building, the ruling price is about $50 per ton. This is about $6 less than the price that was paid three years ago for material which went into buildings like the Corn Exchange Bank. We quote plain material from mill, 1.78c. to 1.88c., Chicago; from store, 2c., Chicago.

Plates.—The principal new business in prospect grows out of a contract for 2000 refrigerator cars placed with the Pullman Company for the Harriman lines, these cars to have steel underframes. The plate mills in this district, however, have contracts that would carry them well into the summer without any new business, although it is expected that Western roads will find it necessary to place large car orders this winter or spring. Prices are very firm and the mills reluctant to take new business. We quote mill prices at 1.78c. to 1.88c., Chicago; store prices, 2c., Chicago.

Sheets.—There is no change in prices and the local mill is in fairly good shape regarding deliveries. Quite a little new business is coming forward this month, and it is very difficult to meet the demand for blue annealed sheets. The first of the eight new sheet mills of the Inland Steel Company will be ready for operation in February, and others will come along in rapid succession, thus making a large increase in the local supply of sheets during the coming year. We quote mill prices as follows, Chicago: No. 10 blue annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—There is much complaint among implement manufacturers and other large buyers of delay in getting deliveries. On ordinary sections the mills are keeping up with their specifications in fair shape, but on tees and odd sections there is no doubt that deliveries are backward. In recent years the implement manufacturers have made considerable progress in eliminating these odd sections and standardizing their business along the path of least resistance. For many years there was a tendency in the implement trade to adopt novelties as a means of attracting the attention and favor of the farmer, but they soon discovered that in a busy season it was very difficult to obtain from the mills anything odd or peculiar in the way of rolled material, and their experience this year will undoubtedly accelerate their efforts to adopt standard designs. The demand for bars from the implement manufacturers has broken all records and the mills are making every effort to supply them. Subject to the usual delay in delivery on soft steel bars, we quote as follows: Soft steel bars, 1.68c. to 1.78c.; bar iron, 1.60c. to 1.65c.; hard steel bars rolled from old rails, 1.58c. to 1.65c., all Chicago.

Rods and Wire.—It was generally supposed that jobbers and other buyers had fully covered their requirements for 60 days when the general advance in prices took effect early in December, but the demand for wire products continues to outrun all estimates, and new business has grown until it amounts to 4000 to 6000 tons a day for the leading interest, coming from both manufacturers and jobbers. The jobbing trade is limited to purchases for 60 days' requirements, but manufacturing consumers are generally covered to April 1, and in some cases, where the necessity is clearly apparent, they have covered their requirements to July 1. Not much complaint is heard regarding deliveries, but the car shortage and inability of the railroads to keep freight moving may cause a shortage of wire material before the winter is over. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—New business is comparatively light, except from machinery manufacturers. The agricultural implement makers who use enormous quantities of special steels have generally specified for their requirements for spring and early summer trade, and their interest centers at the present time in getting shipments on what they specified last fall in time to complete their product for spring trade. In many cases these consumers of steel find that they could have done more business if they could get more material, this old established industry being in the same position in that respect as the automobile manufacturers, some of whom have found they will not be able to complete more than 75 per cent. of the product which they started out to make for this year, owing to the difficulty in getting special grades of steel which they use.

Cast Iron Pipe.—No lettings of moment are reported for the past week. There is a fair volume of routine business with jobbers and railroads and other buyers, and inquiries are coming forward which indicate that there will be considerable business in the near future in the way of formal lettings from municipalities. Prices are unchanged, but firm. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Metals.—Copper is stronger again this week and in the jobbing trade in Chicago 13¾c. is quoted in car lots as the going price for casting copper and 14¾c. for lake. Prices of spelter continue more or less irregular, with a considerable spread between the inside price to large consumers and the prices which jobbers can make on carloads to casual buyers. Tin is a shade easier and dealers are not carrying large stocks. We quote as follows: Casting copper, 13¾c.; lake, 14¼c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33¾c.; small lots, 35c. to 36c.; lead, desilverized, 4.75c. to 4.80c., for 50-ton lots; corroding, 5c. to 5.05c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.15c. to 6.25c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $8, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¾c.; copper bottoms, 12c.; copper clips, 13½c.; red brass, 12½c.; yellow brass, 10c.; light brass, 7c.; lead pipe, 4½c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 28c.

Old Material.—There has been a little flurry in cast scrap the past few days, in striking contrast with the dullness that has prevailed for two months in practically everything else in the way of old material. In some cases foundries have paid as high as $15.50 for No. 1 cast for immediate delivery, although 10 days ago a dealer with this material on track had difficulty in moving it at $14.50. This movement in cast scrap and the general dullness in everything else grow out of the same cause, the stormbound condition of the country, which has reduced the movement of scrap to almost nothing. The principal buyers of rolling mill and steel scrap accumulated large stocks last fall, when material was plentiful, and they have not been affected by the light movement of the past two months, although they have been willing to take the small lots that were offered them by dealers at current prices. At one time local buyers of heavy melting steel attempted to reduce their delivered price to $15.50, but Eastern buyers immediately came into the market and began taking material for shipment to Eastern mills. A few days' trial showed that the $15.50 price was not tenable, and since then there has been a market around $16 for all the melting steel that seeks a buyer in this market, with corresponding prices for shoveling steel, No. 2 railroad wrought, heavy busheling scrap and special lines of material which now go into open hearth steel. This "base" price for heavy melting steel has accounted for the peculiar steadiness in practically all lines of scrap during the past three months. Cast scrap weakened during November and December, in sympathy with pig iron, as scrap at $15 per net ton costs more than Southern iron on old contracts at $12, Birmingham. Now that $18.35, Chicago, has become the minimum for Southern iron, a good many inquiries are coming in for cast scrap. Dealers have been doing very little business in malleable scrap, as the foundries have been making exchange contracts with the railroads to cover their current requirements. The following prices are per gross ton, delivered, Chicago:

Old iron rails	$20.00 to $20.50
Old steel rails, rerolling	18.00 to 18.50
Old steel rails, less than 3 ft.	17.25 to 17.75
Relaying rails, standard sections, subject to inspection	23.50 to 24.50
Old car wheels	18.50 to 19.00
Heavy melting steel scrap	16.00 to 16.50
Frogs, switches and guards, cut apart	16.00 to 16.50
Shoveling steel	15.50 to 16.00

The following quotations are per net ton:

Iron angles and splice bars	$17.50 to $18.00
Iron car axles	21.50 to 22.00
Steel car axles	20.50 to 21.00
No. 1 railroad wrought	14.75 to 15.25
No. 2 railroad wrought	13.75 to 14.25
Springs, knuckles and couplers	14.75 to 15.25
Locomotive tires, smooth	18.50 to 19.00
No. 1 dealers' forge	12.50 to 13.00
Steel axle turnings	12.00 to 12.50
Machine shop turnings	10.50 to 11.00
Cast and mixed borings	7.50 to 8.00
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.75 to 10.25
No. 1 boilers, cut to sheets and rings	11.50 to 12.00
No. 1 cast scrap	15.00 to 15.50
Stove plate and light cast scrap	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	13.00 to 13.50
Pipes and flues	11.50 to 12.00

Philadelphia.

PHILADELPHIA, PA., January 11, 1910.

The market generally has been rather quiet, although indications of an early recovery are observed. Producers of both crude and finished materials are in an exceedingly strong position, order books being comfortably filled, furnaces and mills operating at full capacity, deliveries being freely taken, and, in some cases, being urged, indicating an increasing consumption. Transportation facilities, which were greatly handicapped by the recent storms in this territory, have again about reached normal. Prices in all lines are practically unchanged. Quotations are well maintained and no effort is being made by producers to force business, the general quiet conditions of the market being customary at this season, when affairs incident to the closing of the year claim a large share of attention.

Pig Iron.—There has been some scattered buying, particularly in the foundry grades. Steel making and puddling grades have been quiet, although several sales of low phosphorus iron are reported. There has probably been less small lot buying in foundry iron. Several consumers in this territory have, however, made moderate purchases to piece out requirements. Some few inquiries for requirements during the first quarter and half of the year are in hand and one or two sales of fair sized lots of No. 2 X and No. 2 plain, for the latter delivery, have been made at $19, delivered, for the former, and $18.50 for the latter. A few sales of both of these grades in quantities ranging from 100 to 500 tons, for comparatively early delivery, are also reported at the same figures. The cast iron pipe foundries continue to take moderate lots of low grade iron, largely forge and off basic, at prices varying according to conditions, sales aggregating several thousand tons having been made. Several of the pipe foundries are still in the market and will make further purchases if the iron can be had at prices satisfactory to the buyers. Not much movement in Virginia foundry iron for delivery in this territory is reported. Sales of small lots have been made at the recent level, $16, furnace, equal to $19 to $19.25, delivered in this territory, for No. 2 X. The market has, however, not been seriously tested. No particular movement in Southern iron is reported. No. 2 foundry can be had at $14, Birmingham, for first quarter delivery, while Southern forge has been offered at $13, Birmingham, with no sales. There is still considerable inquiry for low phosphorus iron. Several sales to steel casting plants in this territory, aggregating from 800 to 1000 tons, at prices ranging from $22.75 to $23.25, delivered, are reported. One fair sized lot was sold for Western delivery. Basic iron continues quiet. Buyers are pretty well taken care of as far as near future requirements are concerned and will not consider further purchases except at a price concession. Producers, however, are in a strong position, having about all the business they want at the time, and maintain firmly the recent quotation of $18.75, delivered, for that grade. The general tone of the market is strong. Heavy deliveries on expiring contracts were made by the furnaces prior to the year end, and while it temporarily inconvenienced some consumers to take in the iron, shipments were fully taken. In some instances deliveries on foundry iron are being urged by melters, who find their requirements have, to some extent, exceeded their anticipation. Prices of standard brands have been very firmly maintained and there appears to be no disposition to make any concessions from recent quotations, which for delivery in buyers' yards, east-

ern Pennsylvania and nearby points, during the first quarter, range about as follows:

Estern Pennsylvania, No. 2 X foundry	$19.00
Eastern Pennsylvania, No. 2 plain	$18.50 to 18.75
Virginia, No. 2 X foundry	19.00 to 19.25
Virginia, No. 2 plain	18.50 to 18.75
Gray forge	17.75 to 18.00
Basic	18.75
Low phosphorus	22.75 to 23.25

Ferromanganese.—No demand has developed and the market is at a standstill. Nominal quotations for 80 per cent. ferro, delivery over various portions of the year, range from $44.50 to $45.50, Baltimore.

Billets.—Some further inquiry has appeared from consumers in this territory as well as in the West, one Western buyer being in the market for several thousand tons. Mills are well engaged and are not considering business beyond the first quarter, for which ordinary rolling billets command $30.00 delivered in this vicinity; for prompt shipment, however, premiums are asked. Forging billets are quoted at $32 to $34, Eastern mill, dependent on tonnage and specification.

Plates.—Notwithstanding heavy specifications placed before the year end, makers report a fair volume of fresh business in the past week, greater, in some instances, than was generally anticipated at this season. No large tonnages have come out. Mills are fully occupied and have sufficient business on hand to keep them well employed for months. While some makers refuse to accept business for delivery beyond the first quarter, others take on orders for shipment during the first half. Prices are firmly maintained, 1.75c. to 1.80c. being quoted for ordinary plates delivered in this vicinity.

Structural Material.—Considerable business of good size is pending, although we learn of no important contracts placed during the week. Business recently has been of a seasonable miscellaneous character and mills have a large volume of orders on their books, deliveries, in many cases, still being considerably delayed. Quotations are firm and unchanged, 1.75c. to 1.80c. being named for plain shapes, delivered in buyers' yards, eastern Pennsylvania and nearby points.

Sheets.—The demand continues heavy. Mills have for the most part resumed operations after the year end shutdown and are being rushed to keep up with the demand. Individual orders are principally for small and moderate lots, but the aggregate tonnage is large, in some lines mills being booked to capacity for several months. The situation is strong and the outlook good. Prices are unchanged, the following being quoted for first quarter shipments: Nos. 18 to 20, 2.70c.; Nos. 22 to 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.

Bars.—New business comes out rather slowly, as consumers are largely covered for their early requirements. Refined iron bar makers still refuse to enter orders for extended delivery, while few manufacturers of steel bars are able to make good deliveries on desirable sizes. Even though the market is quiet, the tone is strong, and leading producers firmly maintain prices, refined iron bars being quoted at 1.65c. to 1.75c., delivered, for near future shipments. Steel bars are quoted at 1.65c. to 1.70c., delivered in this vicinity, but deliveries on ordinary sizes are unsatisfactory.

Old Material.—The market has been extremely quiet. In some grades absolutely no movement is noted; in others hardly enough business has been done to establish quotations. Both steel works and rolling mills are well supplied with scrap, and embargoes are still in force at a number of the former plants. One cargo of about 4500 tons of foreign steel scrap arrived at this port during the week, which is being shipped to several of the associated mills. Transportation facilities, which were interrupted by the storm, are again about normal. Owing to the heavy snow, however, but little local scrap is coming to the yards. Prices, owing to the limited amount of business transacted, are quoted nominally as follows, for delivery in buyers' yards in this vicinity:

No. 1 steel scrap and crops	$17.00 to $17.50
Old steel rails, rerolling	18.00 to 18.50
Low phosphorus	23.00 to 23.50
Old steel axles	23.00 to 24.00
Old iron axles	28.00 to 29.00
Old iron rails	20.50 to 21.50
Old car wheels	17.50 to 18.00
No. 1 railroad wrought	19.50 to 20.00
Wrought iron pipe	16.50 to 17.00
No. 1 forge fire	16.00 to 16.50
No. 2 light iron	10.25 to 10.75
Wrought turnings	14.25 to 14.75
Cast borings	12.00 to 12.50
Machinery cast	17.00 to 17.50
Railroad malleable	16.75 to 17.25
Grate bars	14.50 to 15.00
Stove plate	13.25 to 13.75

Coke.—Little interest is manifested, furnace coke especially being rather quiet. Several sales of moderate lots of foundry coke are reported for various deliveries extending up to mid-year. Quotations are unchanged for standard brands, although concessions can be had on less known makes. Stock coke is reported easier. We quote as follows per net ton, for deliveries in buyers' yards in this vicinity:

Connellsville furnace coke	$4.75 to $5.00
Foundry coke	5.25 to 5.50
Mountain furnace coke	4.35 to 4.60
Foundry coke	4.85 to 5.10

Cincinnati.

CINCINNATI, OHIO, January 12, 1910.—(*By Telegraph.*)

The situation in iron and steel suggests an improvement over last week, and leaders in every branch of the trade are optimistic on the outlook. In pig iron the improvement is made obvious in the number and character of inquiries, although as yet large buyers are not in evidence. The week is an interesting one in financial circles because of the annual elections to-day, and the conference of directors previously, general manufacturing and machine tool building enterprises making plans for the year to a larger extent than ordinarily.

Pig Iron.—Statisticians have done considerable figuring on the output of both Southern and Northern irons, and the result suggests to the large sellers a most promising outlook for $1 to $2 advance on the last half. Computations made by an authority on the ground show a total of from 150,000 to 175,000 tons on Southern furnace yards, including warrant iron; exclusive of warrants the amount is reduced to 100,000 to 110,000 tons. Of this latter tonnage, 80,000 tons are credited to Alabama producers alone, or otherwise the Birmingham District, while 30,000 tons are credited to Tennessee. Another opinion reduces this estimate of Alabama stocks from 10,000 to 15,000 tons, which would make Alabama's available stocks about 70,000 tons. Considering the present healthy rate of consumption, it is argued that an advance all along the line is an early probability. A large Ohio pipe making interest has been buying during the week, taking about 20,000 tons of a half dozen different brands, and about equally divided between Northern and Southern. This was largely Nos. 3 and 4 foundry, and the current market prices are reported to have been shaded about 25c. per ton on first half business, with a price of $17.50 on Northern iron for last half. Southern furnaces all seem now to be disposed to accept business for first half on a basis of $14, Birmingham, for No. 2 foundry, although some of the larger interests still quote that price only for first quarter, asking a premium of 50c. for second quarter and in some instances 25c. One Southern interest quotes $14 for prompt, $14.25 for second and $14.50 for third quarter delivery. A sale of 300 tons of No. 3 foundry, standard Southern brand, was made to-day at $13.50 for first quarter. A stove maker in this market has bought 800 tons of No. 3 foundry for prompt shipment at $13.25, Birmingham, but this is a resale iron. Malleable is a strong favorite this week. A 3000-ton order from the West was closed to-day at $17, Ironton, for second quarter delivery. An Ohio user of malleable is buying about 2000 tons for last half at $17.50. A couple of central Ohio users of malleable have yet unbought, but are expected to close ere the end of the month. A sale is reported to-day of 200 tons of Jackson County silvery, 8 per cent. silicon, at $20 for first quarter. Forge is a trifle easier and the range is from $12.75 to $13.25, Birmingham, for first half. Little is heard of basic, $17.25 to $17.50, Valley, being quoted for first half. For prompt shipment and over first half, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$17.75 to $18.25
Southern coke, No. 2 foundry	17.25 to 17.75
Southern coke, No. 3 foundry	16.75 to 17.25
Southern coke, No. 4 foundry	16.50 to 16.75
Southern coke, No. 1 soft	17.75 to 18.25
Southern coke, No. 2 soft	17.25 to 17.75
Southern gray forge	16.00 to 16.50
Ohio silvery, 8 per cent. silicon	20.70 to 21.20
Lake Superior coke, No. 1	18.70
Lake Superior coke, No. 2	18.20
Lake Superior coke, No. 3	17.70
Standard Southern car wheel	24.75 to 25.25
Lake Superior car wheel	21.75 to 22.25

(*By Mail.*)

Coke.—Continued severe weather conditions have operated to restrict production as well as shipments. A slight decline in price is noted, however, in Connellsville furnace coke, which is now obtainable at $2.60 to $2.75 per net ton for first half. West Virginia grades are firm at $2 to $2.25 for furnace and $3 to $3.25 for foundry. Pocahontas and New River foundry grades are obtainable at $2.75 to $3. All consumers of foundry coke are specifying well on their contracts.

Finished Iron and Steel.—The situation in finished material is satisfactory to all interests; consumers are specifying well on contracts, and the outlook is reported as excellent. Sheet mills in the central territory not affected by the labor disturbances of last year are all engaged to capacity and since the first of the year the labor situation has improved materially. Steel bars are quotable here at 1.65c., delivered, although one or two of the leading interests are

asking 1.60c., Pittsburgh. These concerns are announced to be well sold up for the first half and are not soliciting business. Structural material is quotable at 1.60c., firm, deliveries limited to July 1, and dealers are getting 2c. for plates and shapes in stock, and 1.90c. for steel bars. Iron bars are unchanged, the Cincinnati price being 1.55c. to 1.65c. For the American Rolling Mill Company's new mills at Middletown, Ohio, the American Bridge Company will furnish the steel, about 4500 tons, but this is the largest and about the only job of any size in prospect for the early year.

Old Material.—There is no more interest in the market this week than last, and dealers are resting. None of the large consumers of scrap is in evidence in this market at this time, but dealers are firmly of the opinion that it is only a question of a few weeks ere they make themselves known. Some relayers have been sold for shipment into the South and Southwest and into Michigan. Railroads are not offering anything, so far as can be learned. For delivery in Cincinnati and southern Ohio yards dealers' prices are about as follows:

No. 1 R. R. wrought, net ton	$15.00 to $15.50
Cast borings, net ton	8.00 to 8.50
Heavy melting steel scrap, gross ton	15.00 to 15.50
Steel turnings, net ton	9.50 to 10.00
No. 1 cast scrap, net ton	13.00 to 13.50
Burnt scrap, net ton	10.00 to 10.50
Old iron axles, net ton	18.50 to 19.00
Old iron rails, gross ton	18.00 to 18.50
Old steel rails, short, gross ton	15.00 to 15.50
Old steel rails, long, gross ton	16.00 to 16.50
Relaying rails, 56 lb. and up, gross ton	22.50 to 23.00
Old car wheels, gross ton	15.00 to 15.50
Low phosphorus scrap, gross ton	17.50 to 18.00

Cleveland.

CLEVELAND, OHIO, January 11, 1910.

Iron Ore.—The heavy buying movement of non-Bessemer ore which set in two weeks ago continues, and the volume of sales have exceeded the expectations of some of the most optimistic oremen. Two or three of the leading firms have sold practically all their production for the season, except some odds and ends and some of the less desirable grades of ore. It is estimated that the total sales up to the present time, including the Bessemer ores, nearly all of which were reserved a few weeks ago, aggregate fully as much as the sales made in the entire season of 1909. Furnacemen have shown no hesitancy in placing contracts for their requirements for the entire year and not much complaint has been made over the advance in prices. The buying has been heavy by all usual consumers of Lake Superior ores, except the Eastern furnace interests. Some attempt has been made to interest these in the market but without success. The Eastern furnace people say they are not yet ready to buy. It is expected that they will depend largely on foreign ores and not buy much tonnage of Lake Superior ores this season; in fact, the sale of Lake Superior ores in the East has been light since 1907. The lower tariff will affect the Eastern market this year. The advance in prices of 50c. a ton over last year are so far being maintained. One independent interest, however, has not yet announced its prices on non-Bessemer, but expects to do so this week, having made sales to be based on a price to be fixed later. Not much tonnage of siliceous ore has been sold as yet, but the sales that have been made have been at an advance of 15c. to 20c. a ton over last year, and it is expected that the market will be established at that advance. Ore firms are expected to begin chartering vessel tonnage for the season within a day or two. It is practically certain that carrying charges will be advanced 10c. a ton to the rates that prevailed in 1907, making the rate 75c. a ton from the ports at the head of Lake Superior. Estimates are being made that the season's shipments will reach as high as 50,000,000 tons. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—The market shows considerable improvement in sales, and particularly in the volume of inquiries. The most of the activity is in foundry iron, but some malleable was sold during the week, and large malleable consumers are in the market for good sized lots. Little local demand for foundry iron has as yet developed, but local furnace interests have received many inquiries from other districts for lots of 1000 tons and under. A considerable number of these inquiries are for last half delivery, indicating a desire for speculative buying by consumers, who then expect higher prices. Furnacemen so far are refraining from quoting prices for delivery after July 1, realizing that any prices that they might be willing to quote at the present time would not be attractive to buyers. One local interest reports sales of foundry and malleable aggregating between 4000 and 5000 tons. Less is being heard about competition from southern Ohio furnaces, that are reported to have been making sales recently around $16.50, at furnace, for No. 2 foundry. Prices remain about stationary, $17 being the minimum quotation, Valley furnace, for No. 2 foundry. Local furnaces continue to quote No. 2 foundry at $18, delivered, but will shade this price if necessary to meet Valley competition. Some tonnage was sold during the week at $17.75, local furnace, for Cleveland delivery. One local consumer asked for prices on 2000 tons of No. 3, but later withdrew the request. Some consumers that previously bought are in the market for additional tonnage. The demand for Southern iron shows an improvement. We note the sale of 1000 tons of No. 3 Southern to a central Ohio stove manufacturer for spot shipment, and two lots of No. 2 Southern, of 300 tons each, at $14, Birmingham, for the second quarter. For prompt shipment and first quarter we quote, delivered, Cleveland, as follows:

Bessemer	$19.90
Northern foundry, No. 1	$18.40 to 18.65
Northern foundry, No. 2	17.90 to 18.00
Northern foundry, No. 3	17.40 to 17.65
Gray forge	17.25 to 17.40
Southern foundry, No. 2	18.35
Jackson County silvery, 8 per cent. silicon	21.55

Coke.—There is a fair demand for small lots of foundry coke for prompt shipment and a good demand on contracts. Otherwise the market is quiet, consumers of both grades being about covered by contracts. We quote standard Connellsville furnace coke at $2.60 to $2.70 per net ton, at oven, for spot shipment and $2.75 on contract. Connellsville 72-hour foundry coke is held at $3.10 to $3.25 for spot shipment and $3.25 to $3.40 for contract.

Finished Iron and Steel.—Some new business is coming out and prices are very firm. Certain of the local bolt and nut manufacturers, heavy consumers of steel bars, who failed to cover for their full requirements in the latter part of last year, have come in the market for additional tonnage which they desired to buy at 1.45c., Pittsburgh, the price named in their original contracts, but they found that the mills would not sell them under 1.50c. Bar contracts for the first quarter are being made at the latter price, and some business for prompt shipment is being done at 1.60c., Pittsburgh. One mill agency is making bar contracts for the entire first half at 1.50c., but others are so crowded that they are declining to take on any additional tonnage. Some of the large consumers are unable to get shipments on old specifications as fast as needed. The demand for plates and structural material in carloads and less has improved since the first of the year and some orders are being taken for prompt shipment and the first half at 1.60c., Pittsburgh. Local structural shops are in the market for their requirements for the first half. The demand for sheets is fairly active and prices are very firm. The mills are so crowded that few can promise early deliveries. No new structural contracts have been placed, but considerable work is being figured on. Not much new business is coming out in iron bars, but mills are getting good specifications on contracts. Prices remain stationary at 1.65c. to 1.70c., Cleveland. There is a better inquiry for light rails.

Old Material.—The market is still very dull. Prices remain about stationary, the majority of the quotations being largely nominal, but among some of the dealers a firmer feeling has developed in the past few days. Local mills are all still well stocked up and the only orders that are coming from this source are for small lots to fill in, there being no inquiries for round tonnages for future delivery. Considerable scrap is being offered to dealers and some are buying quite freely in anticipation of better prices when the demand improves. Prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$16.25 to $16.75
Old iron rails	20.00 to 20.50
Steel car axles	20.50 to 21.00
Old car wheels	17.00 to 17.50
Heavy melting steel	16.00 to 16.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	14.50 to 15.00
Railroad malleable	16.50 to 17.00
Light bundled sheet scrap	11.00 to 11.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	8.75 to 9.00
Iron and steel turnings and drillings	10.50 to 10.75
Steel axle turnings	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
No. 1 railroad wrought	16.50 to 17.00
No. 1 cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Bundled tin scrap	11.00 to 11.50

Birmingham.

BIRMINGHAM, ALA., January 10, 1910

Pig Iron.—Report is made of the sale of 7500 to 10,000 tons in this market in the past week. A lot of [illegible]00 tons is for delivery covering the entire first half; a lot of 200 tons for shipment to commence immediately and extend into the second quarter, and 800 tons is for strictly first quarter shipment. Smaller lots than those mentioned are for prompt shipment and delivery extending into the second quarter. The price consideration in none of the transactions reported was lower than $14 Birmingham, for No. 2 foundry. An advance of 25 to 50 cents per ton over that basis was received for one or more small lots engaged by reason of the

delivery desired. The highest price reported was $15 Birmingham, and applied to the 800 tons for first quarter shipment which was Clifton high manganese iron. A basis of $14.50, Birmingham, was received for the 2000 tons for first half shipment by reason of an analysis agreement. A lot of 250 tons of gray forge for spot shipment, and which was the only lot of its kind available, was sold at $12.75 Birmingham, or a basis of $14.25 Birmingham, for No. 2 foundry. The $14.25 base has been adopted as a quotation on first half deliveries by a producing interest. Another producing interest has advanced to $14.50 Birmingham, either for spot shipments or the first quarter, and is not solicitous of orders for delivery after that period. The most prominent interest in the district is still out of the market, and the second largest does not seek additional tonnage. The price for the iron held by a leading merchant interest is now understood to be $14.50 Birmingham, although recent statistics indicate but a small decrease in the aggregate of merchant iron during the month of December. As was expected by reason of the usual shutdowns for the holidays, the stock on furnace yards increased materially the past month, but since the general resumption of operations at foundries the movement is at a considerably larger rate and the output is to be decreased by the blowing out of another furnace January 15.

Cast Iron Pipe.—The status of this market is practically the same as at time of last report, no tonnages of consequence having been added to order books and no new contracts for early letting having been advertised. From present indications, the requirement for the city of Huntsville, Ala., will be the next important consideration for local producers. Comparatively small orders for maintenance work being received are fairly attractive, and higher prices than those quoted are being received, but for large contracts, as are given most consideration, a revision of quotations is not authorized. The movement from local plants is materially affected by the continuation of unfavorable weather conditions, both for the loading and placing of material after arrival at destination. However, by reason of the unusually cold weather in this district, the output since January 1 has been somewhat less than normal. We quote water pipe as follows per net ton, f.o.b. cars here: 4 to 6 in., $26; 8 to 12 in., $25; over 12 in., average $24, with $1 per ton extra for gas pipe.

Old Material.—While prices for this material are unchanged, the market is generally conceded to be weaker. Consumers who recently began operations are slow to enter the market for additional tonnage, and the date at which operations of probably the largest consumer in the district will order out shipments is yet undetermined. Since the completion of inventories the offerings to dealers are in considerably larger numbers and receipts during the coming week will no doubt add very materially to stocks on hand. We quote dealers' asking prices as follows per gross ton, f.o.b. cars here:

Old iron axes	$20.00 to $20.50
Old iron rails	16.00 to 16.50
Old steel axles	19.00 to 19.50
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	12.00 to 12.50
No. 1 country wrought	11.50 to 12.00
No. 2 country wrought	11.50 to 12.00
No. 1 machinery	13.00 to 13.50
No. 1 steel	12.25 to 12.75
Tram car wheels	12.50 to 13.00
Standard car wheels	14.50 to 15.00
Light cast and stove plate	10.50 to 11.00

St. Louis.

ST. LOUIS, January 10, 1910.

As an indication of improved business conditions, attention is called to the fact that the St. Louis Post Office reports that 1909 was a record-breaking year. The total postal receipts from all sources were $4,294,134, an increase of $355,475 over 1908. Advices from the stove and range manufactories in this territory are to the effect that business is far ahead of last winter. The gross earnings of the railroads of the South and Southwest show a large increase for December over the corresponding month last year. From present indications, the present year will be the biggest in the commercial history of the city.

Coke.—The coke market continues quiet and featureless. Not being dealt in speculatively and not carrying well unless housed, purchases of coke are confined to current requirements. For these reasons, except with large consumers, the demand for it is steady under normal conditions. Advices from the Pennsylvania fields are to the effect that the output of some companies has been cut down from 25 to 30 per cent. on account of shortage of water, owing to the recent spell of severely cold weather. It is thought this will have the effect of imparting some degree of firmness to the market. Asking prices remain unchanged at $3 for prompt shipment and $3.25 for shipment over the first half for 72-hour standard Connellsville foundry per net ton, f.o.b. oven. There is a fair demand for small lots of smelter coke.

Pig Iron.—With some of the leading sales agencies there is talk of a firmer market, but they fail to report much new business. Inquiries are somewhat more numerous, but these are mostly coming from small consumers. The largest transaction reported is the purchase by a large local car and foundry company of 2000 tons of Southern, No. 2 foundry. An inquiry is pending for 1500 tons of Southern No. 2 foundry, for shipment over the first half. More interest is being shown in malleable iron and there is an inquiry out for 1000 tons, for shipment over the third quarter. A very confident feeling prevails regarding the probability of a steady increase in interest in the market for all kinds of pig iron in the near future, and that active buying will soon be resumed. For Southern No. 2 foundry, $14, f.o.b. Birmingham, is now admitted to be the market price for shipment over the first half, but brokers are advising their customers that any marked improvement in the demand will likely restore last month's figures. Southern Ohio iron is held at $17 to $17.50, f.o.b. furnace.

Lead, Spelter, Etc.—Lead is quiet but firm at 4.65c. to 4.70c.. Spelter is somewhat easier and quoted at 6.07½c. to 6.10c., East St. Louis. Zinc ore is selling at $49 per ton, Joplin base. Owing to the severe weather the production at Joplin is quite small. Tin is 90c. per 100 lb. lower; antimony is up ⅛c.; copper unchanged. The demand for finished metals is fair and as good as could be expected thus early in the year.

Old Material.—There is no improvement in the demand reported by the leading dealers, but they regard it as merely a matter of a short time when active buying will be resumed. Stocks are said to be fully 50 per cent. less than at the corresponding date last year. The only railroad lists out are the Wabash Railroad, 600 tons, and the Vandalia Line, 200 tons. Relaying rails are still very scarce and wanted, especially heavy sections. Prices for iron and steel scrap continue unchanged and nominal. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$16.50 to $17.00
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft	14.50 to 15.00
Relaying rails, standard sections, subject to inspection	25.00 to 25.50
Old car wheels	17.50 to 18.00
Heavy melting steel scrap	14.50 to 15.00
Frogs, switches and guards, cut apart	14.50 to 15.00

The following quotations are per net ton:

Iron fish plates	$14.00 to $14.50
Iron car axles	20.50 to 21.00
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.00 to 14.50
Railway springs	13.00 to 13.50
Locomotive tires, smooth	15.50 to 16.00
No. 1 dealers' forge	10.50 to 11.00
Mixed borings	8.00 to 8.50
No. 1 busheling	12.00 to 12.50
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 cast scrap	13.50 to 14.00
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	11.00 to 11.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	10.50 to 11.00
Railroad sheet and tank scrap	9.50 to 10.00
Railroad grate bars	10.50 to 11.00
Machine shop turnings	10.50 to 11.00

The St. Louis-Joplin Lead & Zinc Company, Joplin, Mo., has recently been incorporated; capital stock, $250,000; incorporators, Amedee B. Cole, C. B. Thompson, Thomas J. Franks and others.

During the past year the sale of automobiles in St. Louis was very large, showing an increase of 50 per cent. over 1908. The grand total of automobile business carried on from St. Louis is estimated to have reached 2008, amounting to $3,122,000. A greatly increased output is expected for 1910.

Buffalo.

BUFFALO, N. Y., January 11, 1910.

Pig Iron.—The market shows growing activity. Large business has been placed during the week, amounting to at least 30,000 tons, comprised principally of foundry grades and malleable, and going largely to New York State markets. Almost the entire list of the different kinds of foundries—pipe, valve, stove, agricultural implement, railroad car shops and general foundries—were represented in the purchasing. Prices have advanced 25 to 50 cents per ton for first half delivery on all lines except charcoal iron, and 50 cents per ton above first half prices is being asked for second half. This additional advance for last half deliveries is for the purpose of partially compensating for the great increase in cost of production which will be in effect after July 1. We quote as follows per gross ton, f.o.b. Buffalo, for first half delivery:

No. 1 X foundry	$17.75 to $18.00
No. 2 X foundry	17.25 to 17.75
No. 2 plain	17.00 to 17.25
No. 3 foundry	16.75 to 17.00
Gray forge	16.50 to 16.75
Malleable	17.50 to 18.00
Bessemer	19.50 to 19.75
Basic	18.25 to 18.75
Charcoal	20.50 to 21.00

Finished Iron and Steel.—The demand for finished products is fairly good, particularly for steel bars for delivery during the first half, but continues to be restricted by the shipping limitations on the part of the mills, most of whom are still three months or more behind on deliveries and holding off on the booking of new business on account of present crowded conditions. Small consumers are in consequence making purchases largely from warehouse stock. The agency of the leading interest reports the Canadian demand for bar products to be well maintained, and a number of contracts booked during the week, both for export and for domestic consumption. The minimum price now quoted for steel bars by this interest is 1.50c., Pittsburgh. In structural material there is continued activity. Wurtz & Son, Buffalo, have received contract for supplying and fabricating the steel for the Faxon, Williams & Faxon building, about 150 tons. The Lackawanna Bridge Company was awarded contract for the steel for the Merchants' Despatch Transportation Company's building at East Rochester, 250 tons. The new shop is being erected for the fabrication of the steel underframes which the Merchants' Despatch Company uses in the construction of its cars, and which it has heretofore purchased from outside fabricators. Figures were received this week for the Erie Engine Works foundry building, Erie, Pa., a structure 128 x 400 ft., requiring 500 tons. Bids will also go in the 15th of this month for the structural material for the State Reformatory building at Elmira, N. Y., involving considerable tonnage.

Old Material.—The condition of the market is practically unchanged, being still very dull, with a slight tendency toward lower prices, this market being influenced to some extent by the weaker conditions existing in the eastern Pennsylvania and Pittsburgh Districts. Prices are also kept down by the uncertainty as to when the renewal of buying which had been expected will take place. No. 1 railroad wrought and wrought iron and soft steel turnings have fallen off 50c. per ton, and the remainder of the price-list is largely nominal. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$16.50 to $17.00
Low phosphorus steel	20.00 to 21.00
No. 1 railroad wrought	17.25 to 17.50
No. 1 railroad and machinery cast scrap	16.50 to 17.00
Old steel axles	20.50 to 21.00
Old iron axles	26.00 to 26.50
Old car wheels	17.50 to 18.00
Railroad malleable	17.00 to 17.50
Boiler plate	14.50 to 15.00
Locomotive grate bars	13.00 to 13.50
Pipe	14.00 to 14.50
Wrought iron and soft steel turnings	10.50 to 11.00
Clean cast iron borings	9.00 to 9.25
No. 1 bushelling scrap	14.00 to 14.50

Iron and Industrial Stocks.

NEW YORK, January 12, 1910.

The stock market maintained its strength up to Monday afternoon, the President's message having been without adverse influence on security values. Higher rates for money also apparently had no serious effect. During this time the most striking advances in industrial stocks occurred in International Harvester common, caused by reports of an early dividend declaration, in Cambria Steel and in International Pump common. A selling movement was precipitated Monday afternoon which carried prices down to some extent from the level which had prevailed in the preceding six or seven days, and the liquidation was continued on Tuesday. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	14½- 15	Railway Spr., com.	48½- 50¼
Allis-Chalm., pref..	53⅛- 54½	Republic, com.....	43¾- 45
Beth. Steel, com...	33 - 33½	Republic, pref.....	103¼-104
Can. com.....	13 - 13⅝	South. I. & S., com.....	23
Can. pref.....	79 - 81½	Sloss, com.....	85
Car & Fdry, com...	69¼- 71⅝	Sloss, pref.....	118½
Car & Fdry, pref..	119¾-120	Pipe, com.....	30½- 31¼
Steel Foundries...	64¼- 66	Pipe, pref.....	83¾- 83⅞
Colorado Fuel.....	47⅛- 49⅛	U. S. Steel, com...	86½- 89⅛
General Electric...	157½-160⅞	U. S. Steel, pref...	123 -124½
Gr. N. ore cert....	78 - 79¾	Westinghouse Elec.	78⅞- 82
Int. Harv., com...	120½-125⅞	Va. I., C. & C.....	73
Int. Harv., pref.....	127½	Am. Ship, com.....	78⅛
Int. Pump, com...	51½- 54⅝	Am. Ship, pref....	111½-112
Int. Pump, pref...	89½- 90	Chi. Pneu. Tool....	39½- 41¾
Locomotive, com..	57¾- 60¾	Cambria Steel.....	48⅜- 53¼
Locomotive, pref..	114 -115	Lake Sup. Corp...	27¾- 28⅝
Nat. En. & St.,com.	25 - 27¼	Warwick	11½
Pressed St., com...	46¼- 51	Crucible St., com..	17⅝- 17⅞
Pressed St., pref.....	105	Crucible St., pref..	92¼- 93
		Harb.-W. Ref., com.....	35½

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 87⅝, preferred 123⅞, bonds 104⅞; Car & Foundry common 70, preferred 118¾; Locomotive common 59, preferred 114½; Colorado Fuel 47⅝; Pressed Steel common 49, preferred 105; Railway Spring common 49½; Republic common 44, preferred 103¾; Sloss-Sheffield common 85¼; Cast Iron Pipe common 30½, preferred 87⅝; Can common 13, preferred 79.

The Iroquois Iron Company, Chicago, has sold to Lee, Higginson & Co. an issue of $2,300,000 5 per cent. first mortgage serial bonds dated December 1, 1909, and maturing serially from 1912 to1929. The bonds are a first mortgage on property which has been recently appraised at $7,321,128, or three times the present issue. Net profits for the last five years have average $297,193, or better than two and one-half times the interest of the new bonds. They are being offered at a price to yield 5½ per cent.

The Pittsburgh Malleable Iron Company, Pittsburgh, has declared a quarterly dividend of 2½ per cent., payable January 20.

The Columbia Weighing Machine Company, Pittsburgh, has declared semi-annual dividends of 4 per cent. on the preferred stock and 3 per cent. on the common stock, payable January 20.

Dividends.—The National Fire Proofing Company, Pittsburgh, has declared a dividend of 1 per cent. on the preferred stock of the company. This is the first dividend declared by the company since April, 1908.

A Proposed Pennsylvania Stove Consolidation.—The *Eagle* of Reading, Pa., under date of January 3, gives some interesting particulars regarding negotiations for the consolidation of the Abram Cox Stove Company, Philadelphia, with the Reading Stove Works and Mount Penn Stove Works, both of Reading, Pa., and other unnamed stove manufacturing concerns at Pottstown, Royersford, Columbia and other points in eastern Pennsylvania. It is stated that stock of a new company is to be exchanged for the properties absorbed on a basis to be determined by inventory taken of the various plants and their assets. The scheme provides that each local plant will remain intact and be operated as heretofore by the people now in charge. The proposition is to be dated as of January 1, 1910. The enlarged company will have a capital of $4,000,000 or $5,000,000. The purposes aimed at are economy of operation and the equalization of prices of the products of the several companies concerned. The president of the Abram Cox Stove Company is Abram C. Mott, who has long occupied a very prominent position in the stove trade of the United States.

The Southwestern Iron & Steel Structural Company has been organized to succeed the Gainesville Iron Works, Gainesville, Texas. The company will establish a plant at Oklahoma City, Okla., where it has begun the erection of two buildings, one story each, 80 x 200 ft. and 100 x 150 ft., respectively, to be used as foundry and machine shops. The company will move the entire equipment of the Gainesville Iron Works to its new location and will therefore not require much new equipment. Mora C. Clark is president.

The Vermillion & Mesaba Iron Company, Duluth, Minn., has been incorporated, with $1,000,000 capital, for the purpose of carrying on exploration work and developing mining properties on the Vermillion and Mesaba ranges. The property acquired by the company includes options on several properties where drills are now being operated, among which is the Robinson Lake property, about midway between Tower and Ely. A drill is also being operated on the Mesaba range.

The American Locomotive Company built 1115 locomotives in 1909, compared with 1170 in 1908. This apparent disparity of figures is due to the fact that a large number of engines built in 1908 were left over from 1907, while delay in construction due to strikes and scarcity of material has left a large number of unfinished orders, which will be completed in 1910.

The output of the Dominion Iron & Steel Company, Sydney, Nova Scotia, in 1909 was 256,272 gross tons of pig iron and 297,320 tons of steel ingots. From these were produced 140,091 tons of rails, 73,047 tons of wire rods and 25,470 tons of merchant blooms or billets.

New York.

NEW YORK, January 12, 1910.

Pig Iron.—Inquiries have been more plentiful than orders in the local market, and there are prospects of business on a considerable scale for delivery in the second half of the year. One Eastern steel company is in the market for 10,000 tons of basic, delivery in the second quarter. Recent transactions in pipe irons indicate that in off basic and forge irons some concessions were made, and that producers have no intention of allowing British makers to market ordinary irons here to any extent. New England business in malleable Bessemer has been done on a considerable scale, most of it going to Buffalo furnaces. In some cases prices were made which are now reported to be no longer available. Something is still heard in this market of Virginia iron, running 4 and 5 in silicon, offered below the current price for No. 2 foundry. Very little is done in spot iron, foundries generally having fair stocks on hand. We quote New York prices on Northern foundry iron for delivery in the first quarter of the year as follows: No. 1, $19 to $19.50; No. 2 X, $18.75 to $19; No. 2 plain, $18.50 to $18.75. Southern No. 1 is quoted at $19 to $19.25; Southern No. 2 at $18.50 to $18.75.

Steel Rails.—Apart from the Baltimore & Ohio and the Chicago & Alton inquiries no considerable business is pending and Eastern mills, with one exception, have comparatively little ahead. Light rails are also disappointing. The Chicago City Railway is in the market for 5000 tons of girder rails, and the Northern Construction Company for two lots of T rails, amounting to about 6000 tons.

Finished Iron and Steel.—The week has been generally quiet, natural, however, at this time of the year. Structural material and particularly plates are moving very slowly, but the New York market for plates is never large at the best. Only one of the plate consuming shops in this territory is reported to be particularly busy; all others are quiet. The one mentioned is making a large number of buoys for the river and harbor and the shop is working at its full capacity. Steel bars continue to be very late in deliveries. With the approach of spring the structural material market will doubtless increase markedly when building operations are more active. All of the contracts mentioned last week as still pending remain unplaced so far as the steel orders are concerned; the municipal building at Springfield, Mass., has gone to a Pittsburgh contractor, but the steel is yet to be ordered. Among the larger new orders is one for 2200 tons for an addition to the T. H. Symington plant at Rochester, N. Y., and one for 1200 tons, also for an extension, for the General Electric Company's works at Lynn, Mass., both taken by the American Bridge Company. The same company has a contract for 1100 tons for bridge work for the Baltimore & Ohio Railroad Company. The Northwestern Structural Company has obtained an order for 400 tons for a building for the Spokane Realty Company, Spokane, Wash. An inquiry is out for 600 to 700 tons for the American Car & Foundry Company's plant at St. Louis, Mo. There is not the same incentive to make contracts for future specifying that there was last year, and as a consequence there is less contracting and more buying for immediate needs only. Prices remain unchanged. On certain sizes and under special conditions there are special prices, but plain structural material is quoted at 1.71c., New York, for large lots, first and second quarter deliveries, and small lots and quicker deliveries bring 1.76c. About the same may be said of plates, base sizes of which in large lots bring 1.71c., New York; smaller lots, 1.76c. Steel bars for long time delivery may be had as low as 1.61c., but the prevailing quotation is 1.66c., and one will not consider an order at less than 1.71c., New York. Ordinary refined iron bars are held at 1.70c. to 1.75c., and test bars at 1.75c. to 1.80c., tidewater, carload lots.

Cast Iron Pipe.—Inquiries for spring delivery continue to be the feature of this market. Many of these inquiries are developing into orders, as buyers appear to be impressed with the fact that prices are likely to be higher as the year advances. Quite a number of municipalities throughout New England are advertising for bids on water and gas pipe for use in the approaching season, but most of these are small. Prices are firm. Carload lots of 6-in. continue to be quoted at $25.50 to $26 per net ton, tidewater.

Old Material.—Although embargoes are still in force against deliveries at numerous steel works in eastern Pennsylvania, the market on steel scrap maintains its strength and an occasional transaction is reported. In other lines the demand is a little better, as rolling mills and foundries are coming into the market more frequently. While trade in general is far from active, it is of larger volume than during the closing weeks of December. Buyers are not so anxious for stock that they will pay full prices, yet dealers are extremely cautious in making sales in view of the fact that the prices they must pay afford little margin for making the necessary turn over. Consumption continues heavy and a better market for old material is confidently expected. Such grades of scrap as No. 1 railroad wrought, track scrap, turnings and heavy cast are slightly stronger. The following quotations per gross ton, New York and vicinity, indicate the present condition of the market:

Rerolling rails	$16.00 to $16.50
Old girder and T rails for melting	15.00 to 15.50
Heavy melting steel scrap	15.00 to 15.50
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	26.00 to 27.00
Old steel car axles	19.50 to 20.00
No. 1 railroad wrought	17.50 to 18.00
Wrought iron track scrap	15.00 to 15.50
No. 1 yard wrought, long	15.00 to 15.50
No. 1 yard wrought, short	14.50 to 15.00
Light iron	9.00 to 9.50
Cast borings	9.00 to 9.50
Wrought turnings	11.50 to 12.00
Wrought pipe	14.00 to 14.50
Old car wheels	15.50 to 16.00
No. 1 heavy cast, broken up	15.00 to 16.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Malleable cast	16.50 to 17.00

Metal Market.

NEW YORK, January 12, 1910.

THE WEEK'S PRICES.

Cents per Pound.

	Copper.			Lead.		Spelter.	
Jan.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
6	14.00	13.62½	33.05	4.70	4.67½	6.30	6.15
7	13.75	13.62½	32.80	4.70	4.67½	6.30	6.15
10	14.00	13.75	32.80	4.70	4.65	6.25	6.12½
11	14.12½	13.87½	32.65	4.70	4.65	6.25	6.12½
12	14.12½	13.87½	32.85	4.70	4.65	6.25	6.12½

Business in the metal market has been running along evenly, with practically no changes except a stiffening in prices on copper, commented on below. Spelter, however, is a trifle weak. There has been nothing but the regular run of business, with no large transactions of which to make note.

Copper.—The report of the Copper Producers' Association, issued this week, shows a decrease in stocks of over 11,000,000 lb., which is the largest noted since last July, when stocks declined some 32,000,000 lb., which, however, was chiefly due to the larger deliveries for consumption and export. This had a tendency to make the market rather firm; no large sales have resulted as far as can be ascertained. Lake copper is quoted around 14.12½c., and electrolytic 13.87½c. Spot copper is quoted in London to-day at £61 8s. 9d., and futures £62 7s. 6d. The market is steady, with spot sales aggregating 100 tons and futures 600 tons.

Pig Tin.—The pig tin market may be classed as dull, with no special features worth mentioning. Imports continue heavy. The London market showed weakness in prices for a few days, but has strengthened somewhat, and to-day's figures are £149 5s. for spot tin and £150 12s. 6d. for futures. Spot sales 200 tons, futures 300 tons.

Tin Plates.—There is absolutely no change in the tin plate situation from our last report and business is rather quiet. A slight advance is reported from London on Welsh tin plate to 12s. 10½d.

Lead.—Lead is not a drug on the market by any means, but there seems to be no special features and prices as well as deliveries are about the same as last week. The outside interests are asking 4.75c. and the American Smelting & Refining Company 4.70c. In St. Louis the price is from 4.65c. to 4.70c.

Spelter.—Spelter has weakened some and it is quoted around 6.25c., New York; in St. Louis it is sold around 6.15c.

Antimony.—Spot prices on antimony remain unchanged. Hallett's is 8.25c., Cookson's 8.50c. and outside brands in the neighborhood of 8c.

Old Metals.—The market is somewhat stronger. Following are dealers' selling prices:

	Cents.
Copper, heavy cut and crucible	13.00 to 13.50
Copper, heavy and wire	12.75 to 13.00
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	12.25 to 12.50
Clean brass turnings	8.75 to 9.00
Composition turnings	10.25 to 10.50
Lead, heavy	4.40 to 4.50
Lead, tea	4.05 to 4.15
Zinc scrap	5.00 to 5.25

The new tin plate plant being built by the Jones & Laughlin Steel Company at Aliquippa, Pa., when fully completed, will consist of 36 mills and will be the largest individual tin plate plant in the world. The first 12-mill unit is expected to be ready for operation in March. The company will give special attention to the manufacture of coke plats for use in making cans.

New Publications.

Analyse Thermique et Metallographic Microscopique. By Dr. E. Rengade. Introduction by Prof. H. C. Chatelier. Pages 176. Publishers, Hachette & Co., 79 Boulevard Saint Germain, Paris, France. Price, 6 francs.

Thermal analysis is the term proposed by Tammann for the study of alloys by means of the heating and cooling curves. As Professor Chatelier points out, this work by Dr. Rengade is the first elementary text book in French on this subject. Previously it was necessary to refer to the original papers, in different languages, or to foreign text books. The best of these is by the German, Goehrens, of which we have a good English translation by Ibbotson.

The book is divided into two parts, the first and largest dealing with the theory and practice of thermal analysis, and the second with microscopy. Both parts are well illustrated, the microphotographs being especially good. The first part, after an introduction, is divided into five chapters, which are respectively: (1) Equilibrium of binary systems, comprising eutectic mixtures, definite combinations, case of two liquid phases and solid solutions; (2) systems formed of three constituents; (3) the phenomena of quenching; (4) thermal study of the iron carbon system, and (5) the practice of thermal analysis. The second part is not divided into chapters, but is taken up under the following headings: (1) Preparation of the sample; (2) attack of the polished surface; (3) microscopic observation; (4) interpretation of results, and (5) metallography of the carbon steels.

Chapter I is very good, starting with solutions of potassium chloride and water, and the meaning of their cooling and heating curves, together with a description of the complete diagram from water on the one hand to the pure salt on the other, the author passes to the lead-tin alloys. Magnesium and zinc are the metals first described whose alloys show a definite compound as a constituent. In all these sections the cases of various salts and water are taken up, usually before the metals, one aim evidently being to show the close relation of this subject to chemistry. Solid solutions are dealt with rather fully, the alloys of bismuth and antimony providing the first examples, the section closing with a reference to the complicated copper-zinc series. This chapter is long, but is well thought out, and presents a difficult subject very clearly. It is the foundation on which the whole book is based. As before mentioned, it is well illustrated, and credit should be given for the valuable and full references.

Chapters II and III are of no great length, but treat their subjects well. In Chapter IV the iron carbon series is dealt with very simply, only those points being presented which are considered proved; the lessons learned in the previous sections being applied to this particular case.

Chapter V is by no means exhaustive, but gives clearly the methods by which thermo-couples may be standardized and the principles of the various ways for obtaining heating and cooling curves.

The section on microscopy is also not exhaustive. In it the rather laborious methods of hand polishing with emery papers are advocated, although disk polishing is given very briefly. It is however, clearly and well written, and includes about seven pages devoted to steel and iron.

The book is intended as an elementary text book, chiefly for students in chemistry, and can be highly recommended for this purpose. It is also of value to all those interested in the scientific study of alloys, including iron and steel. G. B. W.

The Allis-Chalmers Company, West Allis, Wis., is erecting two additions, 100 x 374 ft. each, which will be used as blacksmith shop and machine shop respectively and in which will be installed some of the largest steam hammers in the world. The new additions will represent an expenditure of about $400,000 and will give employment to 1000 men.

Legal Decisions of Interest to Manufacturers.

ABSTRACTED BY A. L. H. STREET.

Patents—Tube-Bending Machines.—The Flinn patent, No. 736,834, for a bending machine adapted specially for bending pipes or tubes for car and locomotive builders, is void for lack of patentable novelty and invention. (United States Circuit Court, Western District of Pennsylvania, Morton Trust Company *vs.* Standard Steel Car Company, 171 Federal Reporter 672.)

Same.—A railroad company may so contract to carry to some point beyond the end of its route as to be liable for delivery at such point, and, when it has so contracted all connecting lines are its agents, for whose default it is responsible. (California Supreme Court, Schwartz *vs.* Panama Railroad Company, 103 Pacific Reporter 196.)

Sales—Acceptance.—A buyer, refusing to accept the goods on a specified ground, thereby waives all other objections to them, providing the specified objection is deliberately stated after complete information. A buyer refused to accept the goods on the sole ground that they were shipped too late. Subsequently he received the invoice, which showed other grounds for a refusal to accept. Held, that he did not waive such other grounds by basing his refusal on the ground first stated. "Acceptance" of goods by the buyer is the receipt of them with the intention of retaining them, indicated by some act manifesting his intention of accepting them unconditionally and as full performance of the contract. (Otsego County Court, New York, Brown & Bigelow *vs.* Bard, 118 New York Supplement 371.)

Freight—Liability of Connecting Railroads.—A Missouri statue substantially provides that when property is received by a railroad company to be transported from one place to another, and where it issues receipts or bills of lading, it shall be liable for any loss, damage or injury to such property caused by its negligence or the negligence of a connecting carrier to which such property may be delivered or from whose line the property may pass. Under this provision a contract was made by a railroad company for a through shipment of goods from a station in Missouri on its own line, and also over that of a connecting carrier, to a destination in Kansas, and, the goods not having been delivered, the railroad company claimed that the loss occurred on the line of the connecting carrier, and that, because of a clause in the bill of lading purporting to limit its liability to loss or damage occurring on its own line, it was not responsible for the loss of the goods shipped under the contract. Held that, as the initial carrier contracted to carry the goods through to destination, it became liable under the statute quoted for the negligence of the connecting carrier, notwithstanding the clause purporting to limit its liability to the loss occurring on its own line. (Kansas Supreme Court, Missouri Pacific Railway Company *vs.* Baden, 102 Pacific Reporter 502.)

Reports that Spang, Chalfant & Co., Inc., Pittsburgh, operating the Etna Iron & Tube Works at Sharpsburg, Pa., will build an open hearth steel plant at Sharpsburg are officially denied. The firm has discussed more or less the matter of building an open hearth steel plant to supply its pipe and tube mills with steel, which it now buys in the open market, but a definite decision has not been reached.

The Sharon Steel Hoop Company, Sharon, Pa., expects to start up its new 35-ton basic open hearth furnace and one of its two new heating furnaces during this month. The capital stock of this company was recently increased from $1,000,000 to $2,500,000, and a considerable portion of the increase is to be spent on improvements to the plant.

The Buick Motor Company is installing the complete power transmission line of the Dodge Mfg. Company, Mishawaka, Ind., in its plant at Flint, Mich., which is stated to be the largest in the world of its kind. So far 4000 standard split iron pulleys, over 2000 hangers and several miles of shafting with flange couplings have been installed.

The Machinery Trade.

NEW YORK, January 12, 1910.

Business with the New York machinery houses the past week can neither be termed dull nor surprisingly active. However, quite a number of unexpected orders were received, as it was naturally understood the holidays and stock taking season would have a tendency to delay new plans. Orders that have been coming in are still mainly for single tools and are scattered over the country generally. One large firm reports considerable business received from its New England territory; another company advises that its Southern and Western business is excellent. A large lot of inquiries, which bear the ear marks of being bona fide, are being received by every one in the machinery and kindred lines, all of which tends to show that the improvement is not confined to any particular section and that the present year should turn out well in the volume of business obtained, although probably at a lower percentage of profit to the machine builder than for some previous good years, on account of the increased cost of manufacture.

What might be termed the only disappointing feature is the slowness of the railroads in getting into the market. The second-hand machinery people are still booking orders, but their stocks of some kinds of machine tools have been considerably depleted. The question of prompt shipment is getting to be a very serious one with both the new and second-hand dealers on certain classes of machine tools, and with the steady and healthy increase of business anticipated this may become a vexing matter for the purchaser.

A number of small boilers and engines have been sold, but orders for large unit plants are still on the prospective list. Some sporadic business in this line has recently been received from the export trade.

The shops of the Titusville Forge Company, Titusville, Pa., will be extended or added to, involving the purchase of some new machinery.

An increase will be made during the year in the manufacturing facilities of the Wood Drill Works, Paterson, N. J. The contemplated extensions have not yet, however, taken definite form.

Construction of a pumping plant for municipal water works is under consideration at New Holland, Pa.

The American Iron & Steel Mfg. Company, Reading, Pa., will install additional motor driven equipment.

The Wallkill Transit Company, Middletown, N. Y., is planning an increase in its power capacity to provide for operating the proposed extension to Montgomery.

A new pumping station is to be built in the spring by the Red Lion (Pa.) Water Company.

A municipal power plant for electric lighting is to be built at Montclair, N. J. Plans are being prepared.

It is reported from Kittanning, Pa., that the Harbison-Walker Refractories Company intends to build a large brick plant there.

The Taylor Iron & Steel Company, High Bridge, N. J., is preparing to put a new steam turbine power unit in operation.

Preliminary plans for a power plant are under consideration by officials of the newly organized Phoenixville, Valley Forge & Stafford Street Railway Company, Phoenixville, Pa.

The Agnew Electric Company has been absorbed by the Virginian Electric & Machine Works, Charleston, W. Va., which will continue to build, but with increased output, the turbine pumps, motors and controllers manufactured by the former. Enlarged shop facilities are also to be provided within the next few months.

The Dunkirk Power & Heating Company, Dunkirk, N. Y., whose power plant extension was recently referred to, may install gas producers and four-cycle double acting gas engines instead of the steam turbines originally contemplated. Alternators will be direct connected to the prime movers in either case, and exciters, pumps, switchboard, &c., also purchased.

The Hobbs-Ives Equipment & Machinery Company, Norfolk, Va., is reported to be in the market for a fire pump.

The Cohoes Iron Foundry & Machine Company, Cohoes, N. Y., will provide within the next few months for some increase in its manufacturing facilities.

The York Motor Car Company, York, Pa., mention of whose plans as to establishing a factory at Evansville, Ill., was made in *The Iron Age* recently, advises it will require quite a number of machines used in the general manufacture of automobiles, especially drop forge hammers. General plans and specifications have not been worked out as yet, but will probably be ready within a short time.

The Wayland Portland Cement Company, Wayland, N. Y., has taken over the cement plant formerly operated by the Thomas Millen Company.

The Economy Woodworking Machinery Company, 309 Broadway, New York, has been organized to market the new Economic wood worker. This machine is especially designed for pattern makers, wagon makers, carpenters and kindred trades.

The Biddle Purchasing Company, 107 Chambers street, New York, requires a machine suitable for making electric welded machine chains.

The Allen Engineering Company, Memphis, Tenn., the incorporation of which company was recently mentioned in *The Iron Age*, will require molding machines for transmission machinery and like apparatus. Lathes, radial drills, milling machines, planer and a complete equipment for a small machine shop will be wanted, as well as hand power traveling cranes, a steam hammer and oil forges. A motor driven air compressor and pneumatic tools are among the list of requirements.

Catalogues Wanted.

The construction department of the National Electric Signaling Company, Brant Rock, Mass., desires catalogues, circulars and price-lists of shop and office equipment and of materials and supplies required in the manufacture of general electrical apparatus.

Chicago Machinery Market.

CHICAGO, ILL., January 11, 1910.

The machinery trade has fulfilled expectation by making a very good beginning for the year 1910. There are many inquiries in the market for machine tools, and buyers show a disposition to decide promptly without much shopping around or delay in making their purchases. The demand for milling machines continues very active, and since deliveries before next fall are out of the question on new machines, there has been an unusual inquiry for second-hand machines of this character. In the first week of the new year one house in Chicago sold eight second-hand millers. There is also very good inquiry for lathes, drill presses and, in fact, practically everything handled in the machinery trade. The business has outgrown the tendency of last year to come out in streaks or spots, as the demand has become more general and steady. During December several houses did the best business of the year, but 1910 is likely to exceed all records. The Chicago, Burlington & Quincy Railroad is receiving bids on a list of machine tools and shop equipment for its shops at West Burlington, Iowa; Havelock, Neb., and Hannibal, Mo., as follows:

C. B. & Q. Machine Tool List for 1910.

One four-spindle drilling machine, motor driven; one belt driven drilling machine, single spindle; one four-spindle belt driven drilling machine; one plain radial drill, heavy duty, for high speed drilling, belt driven; two motor driven variable speed No. 2 horizontal boring mills, for boring, milling, drilling, &c.; two motor driven rapid production vertical turret lathes; one universal, heavy design milling machine, motor driven; one motor driven open turret lathe for bar work; one belt driven 3 x 36 in. turret lathe; one motor driven rigid turret lathe, for heavy bar work; one belt driven brass lathe; one motor driven lathe, for crank pins, &c.; one motor driven lathe, for driving axles and general heavy work; two motor driven lathes, for general heavy work; one motor driven lathe, for heavy bolt and pin work; two motor driven lathes, for valve motion work; one motor driven lathe, mounted on wheels, for bolt and pin work; one motor driven double wheel lathe, for locomotive driving wheels up to and including 84 in.; one Betts slotter, motor driven, for driving boxes, shells, &c.; one double end motor driven punch and shear, for general heavy punching and shearing; one single frame steam hammer, for locomotive frame work, size 2000 lb.; one forcing press, for driving box brasses, side rods, bushings, &c.; one universal grinding machine, for reamers, pins, bushings, &c.; one bolt heating and forging machine; one bolt heading and forging machine, for heading, upsetting and forging forgings up to 1½ in. in diameter; one double head bolt threading machine; one belt driven threading machine, triple head; one triple head bolt threading machine; one triple head bolt threading machine, improved universal die, adjusting heads; one belt driven triple head bolt cutter; one oil forging furnace, for general forgings on 1500-lb. hammer; one furnace, for general forgings on 1500-lb. furnace; one boring machine (wood), for general work; one extra heavy self-feed saw table (wood), for ripping general work; one mortising machine, motor driven; one No. 57-A saw sharpener, for band saws; one saw table, for general work.

The Portland Body Works, Portland, Ind., recently organized to manufacture wooden auto bodies, advises that as soon as it can secure the services of a competent superintendent it will be ready to buy machinery and lay out plans for new factory buildings.

The La Grande Mfg. Company, La Grande, Ore., incor-

porated with capital stock of $30,000 to manufacture a grain separator with an automatic feed attachment, will erect a plant which will consist of a complete foundry and machine shop, the motive power for which will be gasoline.

The Owen Motor Car Company, Detroit, Mich., has purchased a site upon which it will erect a factory. The company was recently organized with capital stock of $500,000 and at present occupies a building 60 x 150 ft., three stories and basement, at which place it is producing cars at the rate of 500 a year, but the new factory when completed will give the company an output of 1000 cars per year.

An order for the expenditure of $1,000,000 for enlarging and improving the Fort Wayne Electric Works, Fort Wayne, Ind., has been authorized by the General Electric Company, of which it is a subsidiary. New buildings to be erected will be of brick construction, four stories, and will make working room for 500 additional employees.

Philadelphia Machinery Market.

PHILADELPHIA, PA., January 11, 1910.

At the close of 1909 the local machinery market was in very much better shape than it was at the opening of the year. During the early months business declined in sympathy with the gradual falling off in general industrial activity. Many plants were operated on a restricted and most conservative basis, and in instances the number of idle tools exceeded those in operation. There was a forward movement in the early summer months, slow at first, but increasing in strength as more active conditions developed in other directions. In many branches of the trade the gain in the volume of business taken during the last half of the year was sharp, and in some cases the volume of orders booked exceeded former records.

The past year may be characterized as one of small individual buying. Conditions were hardly conducive to a sharp expansion in manufacturing lines and single tool purchases were in the large majority. The railroads in this territory have been extremely light buyers of machine tool equipment. During the latter half of the year railroad repair shops were more actively engaged, and while it is understood that additional equipment is needed, the necessary appropriations have been lacking. Railroad purchases of motive power, rolling stock and maintenance of way equipment, which were exceptionally heavy during the second half of the year, have had a favorable influence on the machinery trade and have resulted in good purchases of tools by makers of such equipment. If present indications may be taken as a guide, the outlook for purchases of machine tool equipment by the railroads promises to be much better in the current year.

In scarcely any branch of the trade has there been any pronounced continued activity. At times a sharp spurt would be noted in some one line, which would later quiet down, to be followed by a more active movement in another. Builders of textile machinery were for a time extremely active, but this demand lessened somewhat toward the close of the year. Purchases of the standard machine tools showed a marked betterment in the latter portion of the year, and while deliveries could be had promptly during almost the entire year, there was a decided hardening in the closing months. Milling machines were a particular exception to this rule; manufacturers of this class of equipment were so busy that it was impossible for merchants in this territory to get the desirable sizes except on extended delivery. Builders of the heavier types of lathes, planers, boring mills and special tools of that character became much more actively employed as the year advanced, and the various iron and steel plants became more fully engaged and became more active purchasers. Manufacturers of the smaller special tools have been fairly active throughout the year, this class of business not being affected in the same way as the general lines during extended periods of depression. Builders of tools and machinery in general were much better employed at the close of the year.

A pronounced increase in business was noted during the summer, which became more active later in the year. In a number of cases the business taken during the last four months was sufficient to bring plants back on a normal basis, materially helping out the average for the year, so much so that in a number of instances marked gains in the volume of business as compared to that during 1908 were to be noted, although few were able to reach normal conditions as compared with other prosperous years. During the early part of the year the majority of the plants were being operated on a basis varying from 35 to 60 per cent., some few even below that minimum; the improvement was slow, as is usually the case in this territory after a depression, and not until late in the year could any marked betterment be noted. In November and December the general situation was decidedly better and productive capacities in the different lines were on a basis of 75 to 100 per cent. normal, although in some few plants, where equipment of a special nature was manufactured, overtime was regularly made during the closing months of the year.

One of the difficulties which confronted manufacturers when the expansion came was that of securing a supply of efficient mechanics. Shop organization had, during the dull period, been reduced to the minimum and it required considerable time to again establish a satisfactory working organization. Good mechanics were scarce; the automobile manufacturers had, to a large extent, been gradually absorbing the supply of the better grade of mechanics, and while help was available, it was usually of the less desirable class, and considerable time and trouble was necessary to complete organizations and get plants again operating on a systematic basis.

Locomotive building is on a more satisfactory basis, although still considerably below normal. The Baldwin Locomotive Works, which in 1907 produced 2663 locomotives, turned out in the past year 1023 engines, about 40 per cent. of its former record, but showing an increase of approximately 40 per cent. numerically over the output for 1908. The plant, which was operating close to 30 per cent. of capacity early in the year, was running on about a 65 per cent. basis during the closing months, a good share of the orders on hand being for locomotives of the heavier type. In 1909 this concern turned out 197 electric locomotives. The programmes mapped out for locomotive construction in 1910 at the shops of both the Philadelphia & Reading and the Pennsylvania railroads show a sharp increase. During 1909 these shops ran irregularly for the greater part of the year.

Shipbuilding has been fairly active throughout the year; yards have not been rushed with work, but sufficient orders for government and merchant vessels have come to the Delaware River yards to keep comparatively good forces regularly employed.

The boiler and engine trade in 1909 was rather irregular. Boilermakers were fairly active the greater portion of 1909, the business steadily increasing as the year advanced. Heavy engine builders were operating at 25 to 30 per cent. of capacity during the major portion of the first half, but as the expansion in industrial conditions as well as general building construction requiring power plants improved this branch of the trade showed a sharp betterment, the majority of plants operating at full capacity during the last three months of the year. The production during the year has been estimated by several producers to have been about 75 per cent. of normal, which shows a sharp gain over the output for 1908. Gas and gasoline engines have been in comparatively good demand and have made considerable inroads in the field usually covered by the smaller engine builders.

Prices of machine tools generally were weak during the early portion of the year; makers, in some cases, held quotations firmly, but merchants, and even some producers who were extremely anxious for business, would make concessions at times to secure orders. As conditions became better, prices became firmer, and midyear saw advances in some lines, particularly milling machines, on which makers were then unable to make good deliveries. Later in the year a number of toolmakers stiffened up and moderate advances were more or less constantly made, depending largely on builders' individual conditions. With the first of 1910 came almost a concerted advance in the price of lathes. With higher costs of manufacture confronting the trade, it is believed that an upward movement is in sight in some lines which have heretofore not been affected.

Comparatively little business has been done in the export trade by builders of the usual standard types of tools. There have been some scattered orders for equipment of a special character and for various power transmission specialties; even in the latter lines, however, the volume of business has not been up to the usual standard.

Very little has been done in this territory in the way of extension to plants or new industries in which the machine tool trade has been interested very heavily. Iron and steel works have expanded to some extent, the Bethlehem Steel Company, Eastern Steel Company and Worth Brothers Company making noteworthy additions to their plants, their requirements in the way of power and machine equipment being largely of a heavy and special nature. One large textile machinery manufacturing concern in this city made extensive additions to its plant, but the bulk of the improvements made have been of a less extensive character. The automobile manufacturing industry, which has been rather light in this district, showed considerable advance, several new plants being established. In this city the Bergdoll Automobile Company has just purchased considerable equipment for its new plant, while the Carlston Motor Vehicle Company has recently acquired a plant which it proposes to use for the manufacture of electric automobile trucks. Several steel casting plants also began operations in this territory during the year. The boiler and engine trade

has been interested in the extensive manufacturing and general building operations requiring power and heating installations, which in quite a few cases has resulted in orders of considerable size for that class of equipment.

Hardware specialty manufacturers have in several instances began work on extensive additions, the Enterprise Mfg. Company of this city being one which began work late in the year on a new plant at Cornwells, Pa. A large part of its requirements will, however, be of a special nature. The city of Philadelphia has been quite a factor in certain branches of the trade, particularly in connection with its water department, filtration plant requirements and high pressure fire service installations. Considerable attention will be given by the city to the matter of sewage disposal, probably during the current year.

With many branches of the trade now operating at a close to normal capacity basis, with orders on their books to keep them well occupied for some time ahead and a good volume of prospective business ahead, the trade feels that a most optimistic view of future conditions in the tool and machinery trade is permissible. The railroads promise to be more extensive buyers, industrial concerns are either working close to or at normal capacity, with machinery equipment operating at full capacity. Extensions as well as new plants are proposed, and at the present time there is nothing in sight to interfere with generally prosperous conditions during the year, many in the trade believing that the volume of business will exceed all previous records.

The Week.

Business during the week has been of a rather unimportant character. This, however, is to be expected, as the trade is still busily engaged with annual inventories, and until these business details have been completed will likely give little attention to the purchase of equipment, unless requirements be of an urgent nature. Tool builders generally have order books in pretty fair shape and delayed deliveries continue a factor in some lines. Prices on all classes of tools have been well maintained, being practically unchanged, except for lathes, on which an advance of 5 to 12 per cent., according to the line, became effective with the first of the year. Merchants report a few scattered sales of small tools for prompt shipments, but inquiries have been somewhat easier. Several propositions for moderate quantities of tools are under consideration, but the tendency of prospective purchasers has been to defer action on these matters for a short time, until the usual year end business has been disposed of.

The second-hand machinery market as well as the boiler and engine trade has been comparatively inactive. Builders of new engines and boilers enter the year at comparatively normal capacity, and the outlook for business in that direction is considered very favorable. Steel casting plants are fully engaged; railroads, shipbuilders and locomotive builders have placed considerable business with steel casting makers, and deliveries on new business is steadily hardening. The demand for gray iron castings has been quiet and the trade generally has not yet reached normal conditions.

The new plant of the Union Saw Company, Williamsport, Pa., which is to be located at Frackville, Pa., will comprise a main building with two wings, one 50 x 150, the other 50 x 200 ft. The power plant and hardening department will occupy a separate building, 73 x 77 ft. The buildings will be of brick and steel. A 300-hp. direct connected engine and generator will be installed in the power plant, while the manufacturing department will be equipped with the latest type of machinery, a large proportion of it being of the company's own design. The new plant is expected to be ready for occupancy in March.

The Tindel-Morris Company, Eddystone, Pa., reports business in the last three months of 1909 as amounting to 50 per cent. greater than in the same period in 1908. The greatest demand has come from the automobile industry. Inquiries are numerous and the outlook for the current year very satisfactory. The company reports the following recent orders for Tindel-Albrecht crank shaft lathes: One from the Driggs-Seabury Ordinance Company, one from the Packard Motor Car Company and two from the American Locomotive Company. A Paragon cold sawing machine has also been ordered by the Carpenter Steel Company, while new blades have been furnished the Ramapo Iron Works, Niagara Falls, N. Y.; W. H. Leland & Co., Worcester, Mass.; Great Northern Railroad Company, Superior, Wis., and the Otis Elevator Company, Chicago.

George T. Ruhland, B. L. Gray and H. H. Vail have formed the Marine Equipment & Supply Company of Philadelphia and will open an office and warerooms at 55 North Seventh street on the 15th inst. The new concern will represent the Regal Gas Engine Company, the P. M. & B. Gas Company and the Michigan Propeller Wheel Company, and also engage in the general marine hardware business. Messrs. Gray and Vail have for several years been connected with the gas engine department of the Fairbanks Company, Philadelphia.

New England Machinery Market.

BOSTON, MASS., January 11, 1910.

January business is following the usual course, with a slight falling off in spots, but with a good average run of orders. No new features have developed. Nothing big in the way of requirements is in sight, so far as can be learned. The steady demand is a telling one, however, in piling up totals, which should increase constantly from now until the high tide of the spring trade.

The Bard Union Company, Inc., Norwich, Conn., manufacturer of unions, has purchased a property on Chestnut street, that city, and has made some tentative plans for the erection of a factory on the site. The company states that no definite details have been decided.

The American Stamping Machine Company, Lynn, Mass., has been organized in that city and will manufacture shoe machinery and supplies. The factory will be at 11 State street, where is located the business of the treasurer, John J. Sheehan, who produces shoe racks, shoe machinery, dowels and knives used in the shoe industry. Erastus Woodward, Lynn., is the president. The company is not yet ready to make announcement of the details of its plans.

The Belmont Motor Car Company, New Haven, Conn., is a new Connecticut corporation organized to take over the business of the New York corporation of similar name. The company has established shops at State and Lawrence streets, New Haven, where complete automobiles are now being produced at the rate of one a day. The incorporators are C. Baxter Tiley, William J. Smith and Frank B. Frisbie, all of New Haven.

The hack saw blades and frames manufactured by the Quality Saw & Tool Works, Inc., Springfield, Mass., will hereafter be furnished to the European market by the Quality Saw & Tool Works, Ltd., 2-3 Tower Royal, London, E. C., of which Arthur Bagshaw is the manager. A complete line will be carried in stock.

The Chase Rolling Mill Company, Waterbury, Conn., will build a one-story addition to its factory on North Main street, to be 60 x 100 ft. It will be used in the ordinary extension of the business.

The Connecticut Shock Absorber Company, Meriden, Conn., a new corporation, will put on the market a new shock absorber for automobiles, the manufacturing to be done by the Connecticut Telephone & Electric Company of that city.

The Connecticut Mfg. Company, Waterbury, Conn., allusion to which has been made in this column, will manufacture sheet metal goods, all kinds of rivets and brass castings, and will make a specialty of plating and finishing work for others. The corporation has organized, with Charles H. Swenson as president and treasurer and John Swenson as secretary. C. H. Swenson will be the manager. He has had long experience in metal goods manufacturing, having been for 15 years connected with the office end of plants of the American Brass Company and with the Chase Rolling Mill Company.

The news comes from Providence, R. I., that the American Locomotive Company will enlarge its plant in that city.

It is understood that a company is organizing at Portsmouth, N. H., with the purpose of operating the plant of the Portsmouth Forge Company of that city, which was the outgrowth of the Eastern Forge Company, and the equipment of which was sold at auction recently. The report has it that the corporation is the Portsmouth Power & Mfg. Company and that the product will do drop forgings. The equipment remains in the building, so that if the plan materializes little new machinery would be needed, probably.

The New Milford Electric Light Company, New Milford, Conn., has increased its capital stock from $35,000 to $100,000, with the purpose of making important improvements to its power plant.

Recent announcements of additions to New England manufacturing plants outside of the metal industry include the following: Narrow Fabric Corporation, Allington, Conn., mill, 120 x 400 ft., one story, mill construction; Estes Mfg. Company, Fall River, Mass., enlargement of the Cutler Mfg. Company's mills at Warren, R. I.; Chandler Company, Orleans, Vt., piano manufacturer, new building to replace that recently destroyed by fire, to be 50 x 242 ft., one and two stories; Chicopee Mfg. Company, Chicopee, Mass., one story weave shed, 150 x 240 ft.; Windham Silk Company, Willimantic, Conn., new building in connection with improvements to present mill; Diadem Mfg. Company, Fitchburg, Mass., new corporation to manufacture combs, to take plant of Fitchburg Pin Company, P. W. Flint, secretary.

The Security System Construction Company, H. L. Gilman, vice-president and general manager, Chestnut Hill, Boston, Mass., is about to increase its capital stock to $3,000,000, and will erect a large plant, including structural and plate shops, a foundry and a machine shop during the coming year. Quite an extensive line will be built, including

gas and gasoline engines for marine, motor truck, automobile and stationary use; light and heavy commercial motor trucks; commercial motor boats, including tugboats, lighters, small dredges, &c.; elevators, fireproof windows and building specialties. Most of this line has been perfected and is already on the market. A large amount of machinery will be purchased, including structural tools, foundry and forge equipment, and an extensive line of both light and heavy machine tools, as every part entering into the company's products will be made in its own plant. Large financial interests are stated to be back of this project, options have been already secured on several plants which will be merged, making one of the largest mechanical interests in the East.

Cleveland Machinery Market.

CLEVELAND, OHIO, January 11, 1910.

The past week has been a quiet one with the local machinery houses. Business has been largely of a pick-up nature, orders being mostly for single tools. As the inventory season is on dealers do not expect very much business before the latter part of the month, January usually being one of the quietest months of the year. Few inquiries have come in during the week. There is a good volume of prospective business, however, that will come from inquiries that were received during the latter part of December. In most cases nothing will be done about placing these orders until after inventories and annual meetings. During the lull machinery salesmen are doing missionary work and are expecting to book many good orders later.

Everybody is predicting a big year and machinery dealers are very optimistic over the outlook. During the latter part of the past year manufacturers in the metal working lines, as a rule, had their plants running at practically full capacity, and with better prospects during the next 12 months many concerns are planning plant extensions to accommodate the expected requirements. In many cases these plans will be definitely formulated at the annual meetings to be held this month.

Machinery houses have been advised by several makers of lathes of revision in prices, which in most cases is an advance.

The demand for second-hand machinery continues light. Not many used tools, however, are being placed on the market.

Local machine tool builders start the new year with a good volume of business on their books, some having all the orders they can fill during the next three months or longer. The demand for heavy machinery is growing better, and it is expected that a number of projects requiring considerable machinery of that character will reach the contract placing stage this month. Engineering firms have figured on considerable work during the past two or three months, which was held up until after the first of the year.

In the foundry trade conditions continue satisfactory. The majority of the jobbing foundries working on light gray castings have about all the work they can do.

Extensive municipal improvements, some of which have been under consideration for some time, will be started in Cleveland this year, provided present plans are carried out. On February 17 the question of issuing $2,400,000 in bonds for a new city hall and $2,000,000 in bonds for a new high level bridge to replace the Superior viaduct, which has become inadequate, will be voted upon, and it is expected that both propositions will carry. Two or three years ago the railroads announced their willingness to go ahead with the erection of a new union depot, but further than the preparation of plans involving the expenditure of about $12,000,000, the project has remained at a standstill because of the failure of the recent city administration and the railroads to reach an agreement. Everything now points to a speedy settlement with the railroads and the starting of the work during the present year. The city and the passenger boat companies have reached an agreement by which the latter will be given a lease to property on the lake front and will expend $150,000 in pier and building improvements. The recent settlement of the street railway controversy and the granting of a new franchise to the Cleveland Railway Company will mean the expenditure by that company of about $2,500,000 for additional power equipment, new cars, rebuilding of present cars and extensions.

The Comstock-Wellman Bronze Company, Cleveland, has been incorporated with $25,000 capital to build a plant for the manufacture of brass and bronze castings. A jobbing foundry will be erected, the intention being to make a specialty of automobile work. As soon as a site is selected the company will prepare plans for a plant. The incorporators are C. W. Comstock, S. T. Wellman, F. S. Wellman, Julia A. Wellman and L. W. Comstock.

O. M. Reams, under the name of the O. M. Reams Steam Specialty Company, is establishing a plant at 224 High avenue, Cleveland, for the manufacture of a line of exhaust heads, steam traps, separators and regulators. Until the present time this company has had its products made by another concern. Several machine tools will be purchased in addition to equipment that has already been secured.

The Burt Mfg. Company, Akron, Ohio, expects to build an addition to its plant during the coming spring to provide for an increase in business which is looked for during the year. At the annual meeting of the company held last week the following officers were elected: W. F. Warden, president; H. F. Maranville, first vice-president; M. E. Knowles, second vice-president; J. Asa Palmer, secretary and assistant manager. The above, with Dr. A. A. Kohler, constitute the board of directors.

A new manufacturing plant will be erected in Elyria, Ohio, by the American Pump Company. Plans have been prepared by Architect O. K. Staph of Cleveland.

The Jewett Stamping & Enameling Company, Jewett, Ohio, has increased its capital from $50,000 to $100,000.

Cincinnati Machinery Market.

CINCINNATI, OHIO, January 11, 1910.

Machinery and machine tool concerns are busying themselves with the annual invoicing and cleaning up processes, but with an eye to the exceedingly promising outlook for the year are also ordering castings in number and arranging to put into commission tools that have been idle since 1907. The chief trouble experienced in shop expansion at this time is in securing competent workmen; many machinists whom the slump of 1907 left without employment turned their attention to other lines and a large percentage of these have drifted away from their trade, some out of the city and others into business connections that promise well for the future. This is particularly true of the automobile industry, which is just now beginning to get a good start in this tool manufacturing center. A half dozen large buggy and carriage manufacturers have gradually taken on automobile parts manufacturing machinery, and these concerns are just now emerging as full fledged manufacturers of the modern vehicle.

Tool manufacturers here do not seem so alarmed over the encroachments of the automobile builder, however, as their fellow toolmakers of the East. A new school of tool builders is coming on; the 200 or more youths who are working at the shops and studying in the University of Cincinnati in the co-operative courses and the rapidly growing continuation schools will supply the mechanics of the future, and the big and broad minded tool builder believes that in this education of the mind along with the skillful eye and fingers is found a solution of the problem.

In a selling way the larger tools are having their innings now; radials and planers have both been active in this market during the week and since the first. Dealers report an increasing inquiry, and there is also a feeler now and then from Europe.

From Chicago comes information of a good list of requirements for the largest agricultural manufacturing interest, which, however, gives no positive date of closing. In this list are about 20 lathes. Lathe makers report the matter of standardization now accomplished and all interests harmonized. Prices are being advanced all along the line, but as individuals, and no general announcement is made.

Milling machines, upright drills and boring mills continue as leaders in the selling markets, with, as noted, an increasing interest manifested in planers and radials.

Foundries are all working to capacity. New contracts for castings are, as a rule, based on the sliding scale, but with an increase of about 10 per cent. to the foundryman for his basing price.

The Davies Gas Heated Flat Iron Mfg. Company is the name of a new corporation equipping a building on Beech street in Akron, Ohio, for the manufacture of a patented flat iron. A. H. Davies, the patentee, has worked several years on the idea. The new company will manufacture all sizes from a 3-lb. finishing iron to a 32-lb. laundry iron. A large gas engine, two lathes, two drill presses and a large buffing machine have been installed and work has begun at the rate of 500 irons per day. It is reported that the company has a number of large orders from laundry concerns.

The Brown Wrench Company is a new corporation just formed at Ronseverte, W. Va., to manufacture wrenches. The capital is $50,000 and the incorporators are C. P. Brown, J. F. Brown and F. B. Albert.

Because of imperative demands for more room, the Ohio Malleable Iron Company, a part of the Jeffrey Mfg. Company, Columbus, Ohio, is building a 100 x 400 ft. addition, which will accommodate 150 more molders.

On January 18 the selling forces of the Bowser Mfg. Company, Fort Wayne, Ind., will meet in that city at the headquarters of the company in annual convention. There

will be about 300 of them. On the last days of the year the annual meeting of the company's managers from five branch offices was held. The following attended: E. M. Savercool, San Francisco; W. R. Hance, Toronto, Canada; H. C. Worral, Philadelphia; H. E. Anderson, Boston, and R. S. Colwell, Chicago.

It is announced from Indianapolis that the offices of the Shirley Radiator & Foundry Company, which have been in that city since the establishment of the business, will in the spring be moved to Shirley, Ind. The step has been in contemplation for some time.

The Baltimore & Ohio Southwestern Railroad will build a new machine shop at Garret, Ind., and will also rebuild or repair the roundhouse at that point.

Milwaukee Machinery Market.

MILWAUKEE, WIS., January 11, 1910.

While trade here during the latter part of December showed less diminution in volume than it has at the same season for some years past, orders of any considerable size were very generally held back until after the close of the calendar year, particularly where this coincided with the fiscal year of concerns requiring new equipment. Hence, about the middle of last week business began to pick up very rapidly, and the aggregate of contracts now being closed is uncommonly large. Not a few buyers, however, who put off purchasing until this month find it difficult to secure what they need, except for long deferred delivery, and their plans have had to be modified in consequence. This situation helps manufacturers whose product is not as well established in use and reputation as that of the leading machinery builders, and the present year will inevitably witness expansion considerably beyond normal on the part of many of the lesser concerns. The effect of this, in turn, must be to create a steady local market for machine tools, foundry and boiler shop appliances, power apparatus and machinery of all kinds required in the metal industries. There is hardly a shop in the State but that will be buying at frequent intervals during the year.

Under existing circumstances, prices for finished machinery are unaccountably slow in responding to the greatly increased demand, as compared with a few months ago. Current quotations on the material used, so far as it is obtainable in quantities, do not leave much margin of profit for manufacturing. Were it not for the fact that many of the companies operating shops in this State insured against such a contingency by making favorable contracts early in the fall for large supplies of material to be delivered during the season, some would be severely handicapped now. The existing discrepancy between producing and selling values, with allowance made for a fair return on investment, is a condition to be reckoned with for the future, and its importance does not appear to have thus far had the consideration it deserves. It will certainly not be advisable for manufacturers to count too much upon the gradual readjustment which seems to be generally looked for. Rather should a stand be made at this time by tool builders and others for a range of prices consistent with present conditions of production.

Foundry owners throughout the Northwest are in a particularly fortunate position as compared with machinery builders. While prices for gray iron, malleable iron, open hearth and crucible steel castings are not high, an excellent premium is usually obtainable for advanced deliveries; and, with good management in forcing plants to the utmost capacity permitted by close operating economy, a very tidy profit can be made. The automobile trade continues to buy heavily, the demand showing an increase if anything, and railroad shops have recently been coming into the market for castings in large quantity. Machinery builders of all classes are also making liberal use of custom foundries.

Considerable discussion has been caused here by the controversy over payment to the Pabst Brewing Company of boiler insurance for the loss by explosion, as recently reported at length in this paper. The owner's policy covers $150,000 on six boilers, but it has a clause stipulating that the insurance company shall not be liable for more than $50,000 for damage resulting from any one explosion. Hence that amount was tendered on that ground. The insured claims, however, that the three boilers were not wrecked by a simultaneous explosion, but that one let go after another. It is stated that the case will be decided in court. Among local machinery men opinion favors the insured.

The E. B. Hayes Machine Company, Oshkosh, Wis., is proceeding with plans for the erection of a new shop, in which heavy motor driven tools will be installed. This company's product is being largely introduced in pattern shops and woodworking plants in all parts of the country.

A three-story factory is to be built in the near future at Chippewa Falls, Wis., for the Chippewa Shoe Mfg. Company. Power machinery, blowers and a sprinkling system will be among the requirements of the plant. Electric drive is likely to be used.

Steel frame automobile parts are to be manufactured in a factory which will be built in Milwaukee by the Cream City Trimming Company. Some light tools and power machinery will be used.

A steel bridge 420 ft. long is to be constructed across the Flambeau River at Ladysmith, Wis., by the Menasha Woodenware Company, to connect with its new mill.

It is probable that another gas engine and dynamo of 1500 hp. will be provided this year for the power house of the Milwaukee Northern Railway Company, Port Washington, Wis.

The Chicago Brass Company, Kenosha, Wis., which has been putting its equipment in shape for a heavy season's business, is likely to require some additional machinery shortly, as the rush of orders inaugurated in the fall shows no signs of letting up.

At the New York Automobile Show the A. O. Smith Company, Milwaukee, exhibited an extensive line of pressed steel parts for automobiles, including the new pattern frame made of this material. Fully 60 per cent. of all pressed steel frames used by motor vehicle manufacturers in the United States are produced in the shops of this company, and the plant now being built will provide for a much larger output. Considerable equipment not yet decided upon is likely to be needed at various times during the year.

The T. L. Smith Company, whose projected extensions were recently reported in this paper, has let contracts for the building of a new machine shop considerably larger than the one now operated. A line of tools has already been purchased.

The plant of the American Bridge Company, which burned here last week, will probably not be rebuilt, as the work heretofore carried on at the local plant can be done to advantage at others of the company's branches.

Some new shop tools will be required this season for the repair departments maintained at Beloit, Wis., by the Rockford, Beloit & Janesville Railroad Company and the Beloit Traction Company.

As a result of the large volume of business now being conducted, as well as shop extensions and improvements entered upon, Pawling & Harnischfeger, Milwaukee, who have heretofore operated as a copartnership, recently incorporated for $1,000,000 as the Pawling & Harnischfeger Company. More cranes and machine tools are now being built by this concern than at any period in its history.

The Prescott Company, Menominee, Mich., which has been in some financial difficulty of late as a consequence of undertaking more business than its working capital warranted, will be reorganized on a larger scale. Its condition is generally regarded as essentially sound, and, while the company has several large competitors in this State, there is no disposition manifested to take advantage of its temporary embarrassment.

It is reported, although without confirmation, that the Bierman Automatic Machine Company, Milwaukee, will either build a new plant or considerably extend its facilities.

The Vesper Safety Clevice & Malleable Iron Works, Vesper, Wis., is about to put in operation a new foundry, 60 x 100 ft., and finishing department, 60 x 140 ft., all machinery being motor driven. If the business is as successful as anticipated additional equipment will be required before the end of the year.

Termaat & Monohan Company, Oshkosh, Wis., is putting on the market a centrifugal pump direct connected to gas or oil engine mounted on the same base, making a very compact unit. An addition is to be made before long to the plant in which these machines are manufactured.

Motors for the factory of the Cooper Underwear Company, Kenosha, Wis., referred to some time ago, have not yet been purchased.

The new pumping engine recently put in service here at the North Point Pumping Station has just been subjected to a test of 24 hours' duration. It showed a duty of over 75,000,000 ft.-lb. per 1000 lb. of steam, or 10,000,000 ft.-lb. in excess of contract requirements.

The Fuller & Johnson Mfg. Company, Madison, Wis., is putting on the market a contractor's outfit consisting of heavy diaphragm pump, with capacity of 60 gal. per minute, driven by a gasoline engine. It is stated that this saves the labor of two men over the hand operated pump ordinarily used.

The Chas. H. Stehling Company, Milwaukee, which plans and installs industrial plants of various kinds and is frequently in the market for machinery, has decided upon the erection of a factory building of its own. Motor drive will be used.

Forging, woodworking and power machinery, including electric motors, will be purchased in the near future by the

Fred E. Schuler & Bro. Company, Milwaukee, for a new vehicle factory.

The J. I. Case Threshing Machine Company, Racine, Wis., is planning the erection of assembling works and a large storage plant at Billings, Mont.

The Manitowoc & Northern Traction Company, Manitowoc, Wis., is planning an extension to its power equipment.

The Fairbanks-Morse Company, Beloit, Wis., recently shipped from its works there a gas producer, gas engine and double drum, reversible gear hoist, for installation at Batopilas, Chihuahua, Mexico. Each piece was sectionalized for mule-back transportation, and, with the exception of a crank shaft of 600 lb., no part weighs more than 300 lb. The producer is designed to utilize charcoal, which can be cheaply made from wood on the purchaser's property. In many ways it is a novel outfit, and the result of its operation will be noted with interest. F. P. Erdmer has been sent from the Beloit works to supervise the installation and report on its efficiency.

The Herman Andrae Electric Company, Milwaukee, is low bidder on a large Government contract at Toledo, Ohio.

Work on the factory of the Conradson Automatic Lathe Company, at Madison, Wis., will not start until spring. Equipment for the manufacture of a new type of turret lathe is, however, being arranged for now. This is the third manufacturer of turret lathes to locate at Madison, the others being the Steinle Turret Machine Company and Gisholt Machine Company, each of which, particularly the latter, is doing a large business.

Bids will be taken by the Sheboygan Light, Power & Railway Company for new power house machinery, including the steam turbine generating unit recently referred to, as soon as a bond issue of $114,000 authorized by the Wisconsin State Railway Commission has been disposed of.

The boilers, Corliss engine and generator to be purchased by the C. Reiss Coal Company, Sheboygan, Wis., will not be contracted for until February 1. Bids are being taken by the consulting engineers, Robt. Hunt & Co., Chicago.

A new plant is being established in Racine, Wis., by the Wisconsin Auto Top Company.

Chas. F. Schuetze, Manitowoc, Wis., who may be addressed in care of the Manitowoc Church & School Supply Company, is in the market for a boiler of 125 to 150 hp., Corliss engine, generator, motors, blower system, sprinklers and other machinery for a new woodworking plant in which he is interested.

The Northwestern Malleable Iron Company, Milwaukee, which has a capacity of 30,000 to 35,000 tons yearly, is particularly active at present in furnishing castings of high wearing and resistance qualities for railroads, car and truck builders.

An extension 200 ft. in length is to be made to one of the foundries of the Prime Steel Company, Milwaukee, and another unit of production added, including a new 20-ton open hearth furnace. This will largely increase the capacity of what is now known as the Dutcher works of the company.

Miscellaneous Machinery and Power Equipment.

A plant for the manufacture of adjustable door and window hinges is being established at Brookfield, Mo., by the Twentieth Century Hinge Company. The necessary machinery has been provided for.

In reconstructing the municipal power and pumping station at Bellevue, Iowa, which has been destroyed by fire, machinery of considerably greater capacity will be installed. Plans for the new plant have not yet been completed.

A pumping station is to be built in the spring at Lake Arthur, N. M.

Power and sawmill machinery will be required shortly by Hamilton & Hayes, Johnson City, Tenn., for a new cutting plant.

An electric power plant is being built at Angleton, Texas, by E. M. Masterson. The initial equipment required has been provided.

The purchase of a pumping engine to increase the capacity of the water works is under consideration by the city authorities at Havana, Ill. This will also necessitate a new boiler.

An electric power plant of about 125 kw. will be installed by the Ray Consolidated Copper Company, Ray, Ariz., pending completion of a large generating station.

A pumping plant and complete system of water works will be constructed in the spring at Dodge City, Kan.

Construction of a new one-machine paper mill is being planned by the Kaukauna Fibre Company, Kaukauna, Wis.

Some additional machinery may be purchased in the spring for the electric power plant at Huntingdon, Tenn.

The demand for a largely increased water supply at Winona, Minn., will probably lead to the purchase of another pumping engine about May 1. Motor driven centrifugal pumps, such as will be installed across the river at La Crosse, Wis., are also proposed.

New equipment for pulverizing and calcining will be needed later in the year by the Alabama Portland Cement Company, Demopolis, Ala.

The Union Water Power Company of Lewiston, Maine, whose projected hydro-electric development was recently mentioned, has decided upon a power plant of approximately 11,000 hp. at Clark's Rips on the Androscoggin River, from which current will be furnished for industrial purposes exclusively. Low-head impulse turbines, with vertical shaft alternating current generators, will be required, together with converters, transformers, governors, switchboard, exciters, &c.

A Corliss engine, dynamo, boilers, pumps, &c., will be needed shortly by the Bemis Bag Company, St. Louis, Mo., for a new factory.

Extension of the Ford Mfg. Company's plant at Rockford, Ill., is being planned, although actual work on additions may not be undertaken for some time. Some new machinery will be needed during the year.

The British Columbia Electric Railway Company, Vancouver, B. C., will install steam turbine generating sets aggregating 5500 hp. in capacity, together with boilers, heater, pumps, exciters and control apparatus. Some of the new equipment has already been arranged for.

The Alamo Water Power Company, Alamogordo, N. M., has under construction a hydro-electric power plant of 2000 kw. capacity. The main generating sets are understood to have been already provided for, but some auxiliary machinery will be needed.

Construction of water works is proposed at Milwaukie, Ore., a suburb of Portland.

The Riverside Cement Company, Riverside, Cal., will be in the market some time this year for additional power machinery. Among other extensions proposed is that of an electric railroad in which the company has an interest through a subsidiary corporation.

Plans for providing the city of Ashland, Kan., with water works and a central electric power plant have reached the stage where purchase of machinery will soon be considered.

A steel reservoir tank of 300,000 gal. capacity will be needed this year by the Hannibal (Mo.) Water Company. New pumping machinery may also be bought.

The installation of a mechanical filtration plant is under consideration at Pt. Clinton, Ohio.

Electric motor drive is to be extended in the works of the Dixie Portland Cement Company, Richard City, Tenn.

Work on a power plant, the details of which are not stated, will be started in the spring by the Idaho Falls Electric Railroad Company, Idaho Falls, Idaho.

Pumping apparatus is to be bought shortly by the town authorities at Villisca, Iowa.

A large power plant, including furnaces with mechanical stokers, tubular boilers, two Corliss engines totaling 500 hp., electric generators, heater, pumps, motors, &c., will be required for the new technical school at Buffalo. Plans are being drawn by the Cleveland Engineering Company.

The Commonwealth Electric Company, Freeport, Ill., has been organized to build a power plant for public service and will make immediate provision for the necessary machinery.

Some plant extensions will be made this year by the Auburn Automobile Company, Auburn, Ind., and new equipment is to be added at intervals during the year.

North Yakima, Wash., is concluding negotiations for the water works operated by the Northwest Light & Water Company, which will be enlarged.

The furnaces, boilers and pumping engine required for Bloomington, Ill., as recently mentioned, were not purchased, and new bids will be taken by the municipal authorities.

A two-machine mill will be built this season for the Michigan Paper Company, Plainwell, Mich. Plans are being drawn by Dan J. Albertson, Kalamazoo, Mich.

Motor drive will be provided for in a new factory to be erected in Indianapolis, Ind., by the Indianapolis Globe Company.

The Delaware County & Philadelphia Electric Railroad Company, Clifton Heights, Pa., will be obliged to make provision this spring for considerably more power, and additional electric generating machinery is likely to be purchased.

A new crushing plant, with 10 heavy gravity stamps, has been ordered by the Western Milling & Reduction Company, Battle Mountain, Nev.

A large gas producer system has been decided upon by the Toasted Corn Flake Company, Battle Creek, Mich.

The Lima-Honeoye Electric Light & Railroad Company, which has an engine driven power plant of about 600-kw. capacity, will be obliged to largely extend this during the coming year, and one or more steam turbine sets of considerable size will probably be installed. An entirely new generating station and several substations may be built.

A new plant for the manufacture of motor vehicle parts is being built at Saginaw, Mich., by the Wilcox Engineering Company.

In addition to the pumping machinery, engines, dynamos,

&c., recently purchased for the new municipal station at Grand Rapids, Mich., another electric generating unit is required, together with auxiliary apparatus. Bids will be taken in the near future.

New pumps will be required shortly by the Springfield (Mo.) Water Company, which is proceeding with an addition to one of its plants.

It is probable that during the present year apparatus for one of the largest filtration plants in the world will be purchased by the city of Montreal, Canada.

Woodworking machinery, electrically operated, with power equipment, blowers, &c., is to be required shortly by the Strable Mfg. Company for a new flooring factory at Nashville, Tenn. The main office of the concern is at Saginaw, Mich.

Pumping units are to be bought toward the end of the year by the Montana Power & Irrigation Company, recently incorporated at Santa Fe, N. M.

The Clara Consolidated Mining Company, Swanson, Ariz., is installing an electric power plant of 200 kw. Some additional apparatus will be bought within the next few months.

Electric generating machinery and pumping units will be required about February 1 by the Eldorado Water & Power Company, Eldorado, Texas.

The Texas Midland Railroad has decided upon a gas producer and gas engine for the power station of its car and locomotive shops at Terrell, Texas. The main equipment is already provided for, but some auxiliary apparatus will be required.

Pumping machinery is to be bought in about a month for municipal water works recently authorized at Vandalia, Mo.

A new pumping station will be built at Fairview by the Chicopee, Mass., authorities. Plans are now being drawn.

The municipal authorities at Hibbing, Minn., are considering the improvement of the water works, and some aid may be given by the mine operators.

The plant of the Ruleville (Miss.) Light, Ice & Coal Company, which recently burned, will be rebuilt for larger capacity and modern power machinery installed.

New pumping units and auxiliary apparatus will be needed this year by the Amarillo (Texas) Water, Light & Power Company.

The city of Stafford, Kan., is arranging to secure control of all public utilities, and the local pumping station, electric power plant, &c., will be considerably improved in equipment.

The Standard Tie & Mfg. Company, recently formed at Fairmont, W. Va., will establish a plant for the production of steel ties.

Pumps for water supply will be bought in the near future at Wakonda, S. D.

An electric power plant is to be built at Lewisville, Texas, by the Lewisville Light & Power Company.

Pumping machinery for a new system of water works at Trail, B. C., will be purchased on or before February 15. Specifications have just been prepared.

Construction of a pumping plant for water supply is under consideration at Bassett, Neb.

A motor driven centrifugal pump to deliver 1,000,000 gal. daily, and one of 1,500,000 gal. capacity, will be bought January 15 by the city of Stratford, Ont.

Repairs made to the plant of the Louisville Car Wheel Works, Louisville, Ky., which were recently damaged by fire, will include some alterations and extensions increasing the capacity of the plant.

The pumping plant and distribution system of the Bessemer Water Company, Bessemer, Ala., will be considerably enlarged soon after it is taken over by the city. Developments to that end are now in progress.

Four large gyratory breakers to crush rock for ballast are required by the Metropolitan Street Railway Company, Kansas City, Mo.

Bids will be taken until January 26 by the town clerk, Portales, N. M., for gas producers, gas engines, generators of 75 and 50 kw., pumping machinery, steel tank, &c.

Electric dynamos for alternating current, each driven by a Corliss engine of 200 hp., will be installed at properties operated by the Pittsburgh, Pa., Coal Company, Pittsburgh, Pa. Other equipment for handling coal will be required in considerable quantity during the next few months.

Construction of water works, with pumping units of considerable capacity, is proposed at Wilson, Kan.

The Lincoln Stove & Range Company, Fremont, Ohio, is adding to its electrical equipment.

A pumping plant will be built this spring at Merkel, Texas. Plans for the project have not yet, however, been definitely outlined.

The city of Chesaning, Mich., is proceeding with plans for the construction of a hydro-electric power station on the Shiawassee River. An engineer has been employed to estimate the cost and report on the results to be obtained from damming the river.

A new electric generating plant is to be built at Charleston, Mo., by the Southeast Missouri Light, Ice & Power Company. An engine driven dynamo will be selected for the service.

The Indianapolis Glove Company, Indianapolis, Ind., has let the general contract for the erection of a new factory building, 71 x 120 ft., three stories, at a cost of $35,000. The third story will be used as a sewing room in which about 600 sewing machines will be installed. The company also operates a factory at Eaton, Ohio.

Construction of water works along modern lines and upon a much larger scale than the present system is proposed at Saginaw, Mich., involving the purchase of steam generating equipment and two vertical compound or triple expansion engines. No definite plans have as yet been made.

The Tuolumne Electric Company, which has a hydro-electric plant in operation at Groveland, Cal., is planning extensions.

A new factory, with special machinery motor driven, will be erected in St. Louis, Mo., by the Bradley Stencil Machine Company.

A large contract for new pumping machinery will probably be let before long by the municipal authorities at Flint, Mich.

A small pumping unit is needed at Searcy, Ark., for the sewage plant about to be constructed.

A modern mechanical filtration plant will be installed at New Cumberland, Pa., by the Mountain Water Company.

The Carolina Barytes Company, Stockhouse, N. C., is in the market for a pumping outfit of moderate capacity and other machinery.

The Bentley & Olmsted Company, Des Moines, Iowa, is proceeding with the erection of a new factory. Most of the machinery required has already been contracted for.

A small pumping plant is to be installed in the near future at Vermont, Ill.

The Weston-Mott Company, Flint, Mich., which has been a steady buyer of shop equipment during the past eight months, is reaching the limit of floor space available, and additions will be erected shortly if the plans now maturing are adopted. New tools are also required.

The municipal officials at Assaria, Kan., are laying plans for the building of water works.

The construction of municipal water works is under consideration at Davis, S. D.

A new plant is being erected for the Davis Safe & Lock Company, Portland, Ore. Some equipment has been provided for, but more will be needed later.

The Lead Silver Mining Company, Wallace, Idaho, will in the near future install considerable electrical apparatus.

The Tippecanoe Light & Power Company, Monticello, Ind., will add to the equipment of its electric generating plant, including new apparatus for controlling the power circuits.

A new power and refrigerating plant of large capacity is to be erected by John Morrell & Co., Sioux Falls, S. D. Specifications have not yet been drawn.

Construction of an electric power station is being planned by the Arbuckle & Western Railroad Company, Ardmore, Okla.

The Utility Gas & Electric Company, El Reno, Okla., has been incorporated with capital stock of $1,000,000 to continue the business of the El Reno Gas & Electric Company.

A company has been formed in Salt Lake City, Utah, to take over the electric part of the Salina (Utah) Roller Mill & Electric Light Company. It is proposed to move the present plant from its station in the mouth of the Salina canyon to what is known as Rattlesnake Hill, where the company has an option on a site, and erect a plant large enough to supply the towns adjacent to Salina, as far north as Gunnison and as far south as Sigurd. Definite plans for these improvements will not be decided upon until about March 1.

The erection of a pumping station for water supply is proposed at Corydon, Iowa.

A crushing plant, with heavy gyratory breaker, will be installed by the Lumberman's Portland Cement Company, Carlyle, Kan.

It is reliably stated that the People's Railway Company, Dayton, Ohio, will build a new power plant. Detailed plans do not appear, however, to have as yet been determined upon.

The Virginia Power & Water Company, Virginia, Minn., is understood to be in the market for additional machinery.

The Osceola Consolidated Mining Company, Houghton, Mich., is adding to its electrical equipment. A new compressed air outfit may also be purchased.

Hydraulic power and pumping machinery will be needed some time this year by the Kiowa Valley Reservoir & Irrigation Company, Denver, Colo.

The U. S. Gas & Electric Company will install steam turbines in the Wayne County electric power plant, at Lyons, N. Y., which it recently acquired, and modernize all of the generating system.

Ground is being broken by the Whatcom County Railway & Light Company, Bellingham, Wash., for the new power plant mentioned some weeks ago.

The plant of the Mogul Wagon Works, Hopkinsville,

Ky., will be extended and some new machinery installed.

Boilers, engine and an electric generator will be required in the near future by the Century Knitting Company, Spring City, Pa.

San Francisco has decided upon the building of a modern three-unit incineration and electric power plant. Besides the special furnaces required, bids will be taken on boilers, steam turbines, turbo-alternators, superheaters, pumps and other machinery necessary to such a station.

The Ferris Light & Power Company, Ferris, Texas, will build a new power plant of the same capacity as that which recently burned, but with provision for future expansion by the installation of additional units.

New water works, with modern machinery, will be constructed this year at Calexico, Cal.

Some additional shop equipment will be provided for this year by the A. Kieckhefer Elevator Company, Milwaukee, Wis.

Two centrifugal pumps having an aggregate capacity of 3,000,000 gal. daily, and a Corliss engine of 125 to 150 hp., will be bought in the near future for municipal water works at Arkansas City, Ark.

The Sweetwater Light, Ice & Water Company, Sweetwater, Texas, contemplates increasing the capacity of its plant.

Equipment for mining iron ore will be required at intervals during the year by the Maxwell-Knight Iron Company, which has been organized at Bristol, Tenn., to develop mines in Johnson County.

The Lake Union Brick Company, Seattle, Wash., is enlarging its system of electrical operation and will install some new machinery.

A power station of about 3000 kw., arranged for future extensions, may be constructed in the spring by the Gary, Hobart, Valparaiso Traction Company, Valparaiso, Ind., recently organized, which is preparing to build an electric line between the points mentioned.

A new municipal lighting plant is to be built at Valentine, Neb. The contract for the building has been let, but the machinery is yet to be purchased.

A large steam turbine power station, situated about midway of the line, will be built by the Kokomo Western Traction Company, Kokomo, Ind.

The Bakersfield & Ventura Railroad Company, Oxnard, Cal., contemplates increasing its power facilities, although definite plans have not yet been determined upon.

The Buffalo Tool & Supply Company, 15 Swan street, Buffalo, N. Y., has been incorporated by the following: A. B. Kellogg and Charles Park, Buffalo, and Myron Grennell of Waymart, Pa. This company will make a specialty of woodworking machinery.

The Western Implement Company has been organized at Indianapolis, Ind., and incorporated, with $10,000 capital stock, to manufacture agricultural implements and machinery. The directors are J. H. A. Ross, I. M. Ross and C. A. Ross.

The Indiana Specialty Works has been organized and incorporated at New Albany, Ind., with $10,000 capital stock, to manufacture automobile parts. The incorporators are August Kahler, Anton Kahler and Margaret H. Kahler.

The Arthur B. Brown Mfg. Company has been organized at Indianapolis, Ind., and incorporated with $10,000 capital stock to manufacture automobile tires and other rubber goods. The directors are W. H. Coburn, P. H. Keller and R. A. Meek.

The Western Machine Works, Indianapolis, Ind., has increased its capital stock from $6000 to $10,000. G. J. Schlotzhauer is president of the company.

The Sanitary Construction & Mfg. Company, Terre Haute, Ind., has increased its capital stock from $125,000 to $150,000. E. F. Kellie is president.

Government Purchases.

WASHINGTON, D. C., January 11, 1910.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids January 4 for the following:

Class 61. One standard planer.—Bidder 15, Cincinnati Planer Company, Cincinnati, Ohio, $942.80; 38, Fairbanks Company, New York, $887; 45, Garvin Machine Company, New York, $935; 77, Manning, Maxwell & Moore, New York, $897; 80, Niles-Bement-Pond Company, New York, $895 and $1120.

Class 81. One crank slotting machine.—Bidder 38, Fairbanks Company, New York, $1027; 77, Manning, Maxwell & Moore, New York, $875 and $998; 80, Niles-Bement-Pond Company, New York, $950; 108, William Sellers & Co., Philadelphia, Pa., $920.

The Bureau of Supplies and Accounts, Washington, will receive bids until January 25 for the following:

Schedule 2127: One radial drill, one 20-in. engine lathe, one 36 x 36 in. engine lathe, one mortising machine, one wood shaping machine, three punch and tube formers, one squaring shear, one ring and circle shear.

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CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report

IRON AND STEEL—

Bar Iron from store—

Refined Iron:
1 to 1¾ in. round and square } ₩ lb 2.00¢
1½ to 4 in. x ⅜ to 1 in. }
1½ to 4 in. x ¼ to 5-16 ₩ lb 2.20¢
Rods—⅜ and 11-16 round and square ₩ lb 2.20¢

Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.25¢
3 in. x 5-16 in. and ⅛ in.	2.50¢
1½ to 2½ in. x ⅛ in.	2.35¢
1½ to 2½ in. x 5-16 in. and thicker	2.25¢
1 to 1¼ in. x 5-16 in.	2.35¢
1 to 1¼ x ⅛ in.	2.45¢
⅞ x ⅛ in.	2.55¢
¾ x ⅛ in.	2.65¢
⅝ x ⅛ in.	2.70¢
¼ x 5-32 in.	4.50¢
Tees:	
1 in.	2.50¢
1¼ in.	2.60¢
1½ to 2½ x ¼ in.	2.30¢
1½ to 2¾ x 5-16 in	2.50¢
3 in. and larger	2.30¢
Beams	2.25¢
Channels, 3 in. and larger	2.25¢
Bands—1½ to 6 x 3-16 to No. 8	2.45¢
"Burden's Best" Iron, base price	3.25¢
Burden's "H. B. & S." Iron, base price	3.05¢
Norway Bars	3.50¢

Merchant Steel from Store—

per lb

Bessemer Machinery	2.00¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R Soft Steel	R. G. Cleaned
No. 16	₩ lb 2.80¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½
Patent Planished, W. Dewees Wood, ₩ lb A, 10¢, B, 9¢ net.

Galvanized.

Nos. 14 to 16	₩ lb, 3.20¢
Nos. 22 to 24	₩ lb, 3.55¢
No 26	₩ lb, 3.75¢
No. 28	₩ lb, 4.10¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—Galvanized.

Nos. 22 and 24	₩ lb ..5 75¢
No. 26	₩ lb ..6.25¢
No. 28	₩ lb ..7 25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd.
No. 24	₩ 100 sq ft. $3.85	4.80
No. 26	₩ 100 sq. ft. 2.95	4.70
No. 28	₩ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.60
A. Charcoal:	
IC, 14 x 20	$5.40
IX, 14 x 20	6.50

American Coke Plates—Bessemer—

IC, 14 x 20 107 lb	$4.40
IX, 14 x 20	5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8 50
IX, 20 x 28 with an 8 lb coating	10.50

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):	
⅜ x 6 and smaller	70&7½%
Larger and longer	65&5%
Common Carriage (rolled thread):	
⅜ x 6, smaller ands horter	70& 12½%
Phila. Eagle, $3.00 list	80&5&80&1%
Bolt ends with C. & T. Nuts	65&5%
Machine (Cut Thread):	
⅜ x 4 and smaller	70&12½%
Larger and longer	65&10%

Nuts

Blank or Tapped.

Cold Punched:	Off list.
Square	4.90¢
Hexagon	5.50¢
Square, C., T. & R.	5.30¢
Hexagon, C., T. & R.	6.10¢
Hot Pressed:	Off list.
Square	5.40¢
Hexagon	5.80¢

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 20½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 15¼¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 15¼¢ ₩ lb

Brass Wire—

List August 1, 1908 15¼¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 15¼¢

METALS—

Tin—

Straits Pig ₩ lb 36@36¼¢

Copper—

Lake Ingot	₩ lb 14⅝@15 ¢
Electrolytic	₩ lb 14⅝@15 ¢
Casting	₩ lb 14½@14¾¢

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢
Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.
Sheet Copper Polished 20 in wide and under, 1¢ ₩ square foot
Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.
Planished Copper. 1¢ ₩ square foot more than Polished.

Spelter—

Western ₩ lb 7 @7¼¢

Zinc.

No 9, base, casks ₩ lb 8½¢ | Open ₩ lb 9¢

Lead.

American Pig	₩ lb 5½@5¾¢
Bar	₩ lb 6⅝@6¾¢

Solder.

½ & ½, guaranteed	₩ lb 21½@22 ¢
No 1	₩ lb 18½@19 ¢
Refined	₩ lb 16½@17 ¢

Prices of Solder indicated by private brand vary according to composition

Antimony—

Cookson	₩ lb ..@10¢
Hallett's	..@10¢
Other Brands	..@9½¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No 1 Aluminum (guaranteed over 99% pure), in ingot for remelting	34¢
Rods & Wire	Base Price 31¢
Sheets	Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	—Cents—
Copper Heavy cut and crucible	₩ lb 11.50@11.75
Copper, heavy and Wire	₩ lb 11.00@11.25
Copper, Light and Bottoms	₩ lb 10.00@10.25
Brass, Heavy	₩ lb 7.75@ 8.00
Brass, Light	₩ lb 6.50@ 6.75
Heavy Machine Composition	₩ lb 10.50@10.75
Clean Brass Turnings	₩ lb 7.50@ 7.75
Composition Turnings	₩ lb 8.50@ 8.75
Lead, Heavy	₩ lb ..@ 3.75
Lead Tea	₩ lb ..@ 3.50
Zinc Scrap	₩ lb ..@ 4.50

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